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nd associates in 1950 and 1951.[2] They received the odent-adapted TN type 2 virus, after which four f the seven children excreted fecal virus detectable monkey kidney tissue culture. No attempt was ade to isolate fecal virus by mouse inoculation.

TABLE 1.—*Persistence of Antibodies to Type 2 Poliovirus in Children Fed TN Strain—Clinical Trial Group A*

Subject*	Virus Dose Fed (Log10 MPD50)	Virus in Feces (Days After Feeding)	Reciprocal of Neutralizing Antibody Titer (No. of Mo. After Feeding Shown in Parentheses) 1-2 Mo.	33-72 Mo.	56-101 Mo.
1	5.0	4, 9	690(1)†	128(72)	128(101)
i	4.0	none	96(1)	16(72)	32(100)
(	2.1	13	256(1)	128(72)	64(94)
5	2.1	9, 13	256(2)	128(72)	64(91)
1	2.1	9	422(1)†	256(72)	128(91)
3	2.1	none	32(1)†	256(54)	16(91)
1	2.1	none	378(1)†	32(54)	16(91)
C‡	5.5	11, 17	128(2)	256(33)	256(56)

* Original identifying numbers retained, as given in reference 2.
† Mouse protective test.
‡ Member of clinical trial group "B." (See text.)

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significant serum antibody titers obtained from hese children three, four, five, and six years after vaccination have been reported.[3]

Group B.—Group B consisted of children in an nstitution who received the SM N-90 type 1 chick embryo–adapted strain of poliovirus in 1954 and 1955.[4] All subjects showed excretion of virus. Persistence of antibody has been reported at one year nd at two and one-half years after vaccination.[5]

Group C.—Group C included normal infants less han 6 months old who were fed poliovirus in 1955-1957 by Koprowski and his colleagues.[6] The 13 nfants each received one or two of four different vaccine strains: the TN type 2 strain, the SM type 1 strain, the monkey kidney–adapted CHAT type 1 strain, or the similarly adapted Fox type 3 strain. Fecal excretion of poliovirus occurred after all feedings with the exception of one with the TN virus.

Administration of Virus.—The virus was administered by bottle or dropper as virus-containing fluid diluted in milk or a similar bland vehicle. Detailed data relative to administration of virus and clinical observations were reported previously.[7]

Laboratory Studies.—The tests for neutralizing antibodies reported here were performed with monkey kidney or HeLa cells by either one of two methods: the metabolic inhibition test [8] or the roller tube test proposed by Gard.[9] The serums from groups A and B were titrated by the metabolic inhibition test. In all tests the 1958 serums were paired with serums obtained in 1955 or 1956.

Serums from Group C before and up to seven months after vaccination were also tested by the metabolic inhibition test, while serums obtained from this group in 1958 were tested by the Gard technique. Paired specimens from group C, with one exception, could not be tested, because serums obtained prior to 1958 were unavailable. The single earlier serum which was available gave a titer in the 1958 Gard tests identical to that observed previously with the metabolic inhibition test. Isolation of virus from stools was performed in monkey kidney tissue culture, according to a method already described.[10]

Results

All 27 subjects have remained well, without apparent illness as a result of their exposure to attenuated poliovirus. The determinations of neutralizing antibody in these subjects as well as pertinent data relative to their vaccinations are given in tables 1 to 3.

Group A.—Approximately eight years after vaccination, all seven individuals in group A have type 2 antibody titers ranging from 1:16 to 1:256, with a median of 1:64, as shown in table 1. The current titers on the average are one twofold dilution less than those demonstrated approximately six years after vaccination. In comparison with type 2 antibody levels determined one to two months after feeding, the current titers show a decline averaging about three twofold dilutions. Also included in table 1 and discussed below is a type 2 feeding to a member of clinical Group B.

Group B.—As shown in table 2, group B demonstrates the persistence of antibodies to type 1 attenuated virus for four and one-half years. The serums obtained in 1958 had titers ranging from 1:16 to 1:512, with a median of 1:128. These le are below those determined approximately t one-half years postvaccination by about fold dilution, but on the average are equal to obtained one to three months after feeding. Sub SC, who was given SM type 1 and TN typ poliovirus simultaneously four and one-half yea prior to the 1958 tests, retained antibodies to both types (tables 1 and 2).

TABLE 2.—*Persistence of Antibodies to Type 1 Polio in Children Fed SM Strain—Clinical Trial Group B.*

Subject	Virus Dose Fed (Log10 TCD50)	Virus in Feces (Days Inclusive After Feeding)	1-3 Mo.	27-34 Mo.	47-56 Mo.
SC	3.8	3-11	384(2)	512(33)	128(56)
JC	5.2	5-46	64(3)	512(34)	256(52)
Bo	4.2	3-51	384(1)	64(31)	32(50)
T	4.9	4-50*	96(1)	64(31)	16(50)
W	4.0	4-34*	128(1)	512(28)	256(48)
Ge	4.7	2-30	256(1)	1,024(28)	512(48)
Go	4.4	3-19*	32(1)	32(27)	64(47)

* Excretion not studied beyond this time.

Group C.—Fourteen feedings of attenuated poliovirus were given to the 13 infants in group C, as shown in table 3. Infant C2 was given separate feedings of SM and TN strains two months apart. The infants were vaccinated orally at 5 days to 6 months of age when moderate titers of transplacental serum antibody were present in all but one instance. Such antibody apparently exerted no inhibitory effect on the active response to alimentary multiplication of poliovirus, except that antibody response to vaccination had to be judged not only by a fourfold increase in titer but also by the persistence of significant antibody levels beyond the time when transplacental antibody would be expected to survive. The method of judging the expected decline of such passive antibody has been described elsewhere.[6b]

The SM strain was ingested by seven infants, all of whom have maintained high levels of antibody (1:256 to 1:1,024) 15 to 28 months after feeding. The CHAT strain was administered to two infants, both of whom continued to have type 1 antibodies, approximately one year later. The TN type 2 strain was given to three infants, all of whom had antibodies 21 to 25 months after feeding. One of the [illegible] however, retained a type 2 titer of only 1:6.

Two infants were bled 14 months after having received the type 3 Fox strain. While one of them (C37) retained type 3 antibody at a titer of >1:1,024, the other infant (C34) had no demonstrable antibody to type 3 virus even when undiluted serum was tested.

Infant C34 received $10^{5.5}$ TCD_{50} of Fox virus in December, 1956, when a titer of 1:64 of type 3 transplacental antibodies was present. Type 3 virus was isolated without difficulty from his feces on the 3rd, 7th, and 10th days postvaccination, but not on the 14th day. The type 3 antibody titer after feeding was 1:64 and 1:48 at 29 days and 56 days respectively. The titer thus remained stable for two months after vaccination instead of following the expected decline of passive antibodies. These data fulfill the criteria of a successful vaccination of infants as previously defined,[6b] but it must be noted that in the absence of definite evidence of an increase in antibody it is possible that in this subject a poor antigenic stimulus was produced originally.

Intestinal Resistance to Poliovirus Infection.—It was of obvious interest to determine whether intestinal resistance to poliovirus infection would remain after the loss of detectable antibodies in the serum of infant C34. Accordingly, 19 months after the original feeding in December, 1956, a second dose of $10^{5.5}$ TCD_{50} of Fox strain was given to infant C34. The results of the two feedings are compared in table 4. Type 3 virus was easily recovered from the stool after the first feeding by direct inoculation of a suspension into monkey kidney tissue culture, whereas after the second feeding similar direct inoculation of stool suspensions demonstrated only a trace of virus at 10 days after feeding. A blind passage of the tissue culture fluid from the tubes inoculated with stool suspension from this second feeding demonstrated type 3 virus on the 7th, 10th, and 14th days after feeding. The type 3 antibody titer, which was undetectable on the day of second feeding, rose to 1:64 one month later.

TABLE 3.—*Homotypic Antibodies to Poliovirus in Infants Fed Attenuated Strains of Virus—Clinical Trial Group C*

Strain	Type	Subject*	Age at Vaccination (Mo.)	Virus Dose Fed (Log_{10} TCD_{50})†	Virus in Feces (Days Inclusive After Feeding)	Reciprocal of Neutralizing Antibody Titer to Type Fed (No. of Mo. After Feeding Shown in Parentheses)				
						At Time of Feeding	1 Mo.	2 Mo.	3-7 Mo.	11-27 Mo.
SM	1	C 2‡	3	4.7	1-56	64	64	712	1,024(3)	512(28)
TN	2		5	5.3	None	24	1,024		<128(5)	6(25)
SM	1	C 7	5	5.1	1-74	6	178	1,024		1,024(25)
SM	1	C 10	3	2.8	1-70	16	256	712		256(24)
SM	1	C 11	2	4.1	3-24	48	256			1,024(23)
SM	1	C 14	6	4.8	2-55	<4	302			1,024(20)
	1	C 26	5 Days	4.8	3-38	256	64	256	256(3)	512(20)
	1	C 32	2	5.8	3-52	96	64	1,024	712(3)	712(15)
	1	C 40	3	7.5	1-23	24	256			...§(12)
	1	C 46	1	7.5	1-26	48	64			128(11)
	2	C 6	5	5.3	Not tested	64	256		178(7)	>1,024(25)
TN	2	C 20	3	4.5	13-72	64	256	256	256(3)	256(21)
Fox	3	C 34	2½	5.5	3-10	64	64	48		0(14)
Fox	3	C 37	2	5.5	3-24	256	64	384		>1,024(14)

* Original identifying numbers retained, as given in reference 6.
† In TN feedings, 50% mouse paralytic dose.
‡ Infant C2 received both SM and TN.
§ Antibody detectable at 1:4, but serum not sufficient for titration.

Factors Related to Serologic Response.—In group C (table 3) neither the young age of the infants nor their possession of transplacental antibodies had any discernible effects on antibody levels after vaccination. For example, infant C26 was given the SM strain at 5 days of age when his type 1 titer was 1:256. He excreted poliovirus for 35 days after feeding and his type 1 titer rose to 1:256 at 3 months of age after an earlier drop to 1:64 at one month of age. Twenty months after vaccination a titer of 1:512 was present.

Natural Booster Infection.—The possibility was considered that booster infection by natural wild poliovirus may have contributed to the persistence of antibodies. In order to determine the likelihood of natural homotypic infection the heterotypic antibody titers (to poliomyelitis types not fed) were studied in the most recent specimen from each subject. The results, presented in table 5, show that heterotypic antibody was absent in the majority of tests. In about 30% of tests, i. e., 33% for groups A and B and 24% for group C, such antibody had been acquired since vaccination.

TABLE 4.—*Response of Infant C 34 to Two Feedings of Fox Strain Virus Nineteen Months Apart**

	Feeding 1—12/10/56 ($10^{7.5}$ TCD$_{50}$)		Feeding 2—7/15/58 ($10^{7.5}$ TCD$_{50}$)	
Days After Feeding	Type 3 Fecal Virus	Type 3 Neutralizing Antibody	Type 3 Fecal Virus†	Type 3 Neutralizing Antibody
0	0	1:64	0	0‡
3	+	...	0(0)	...
7	+	...	0(tr.)	...
10	+	...	tr.(+)	...
14	0	...	0(+)	...
17	0	...	0(0)	...
21	0	...	0(0)	...
29	..	1:64	...	1:64
38	..	1:48	...	...
14 mo.	..	0‡	...	...

* Symbols: + = positive; 0 = negative; tr. = trace

† Symbols in parentheses show results of blind passage

‡ No type 3 antibody in undiluted serum.

Comment

The results in general support the concept that seroimmunity after live-virus vaccination is of long duration. The seven children in group A who were vaccinated with TN strain in 1950 or 1951 have been followed longer than any other recipients of poliomyelitis vaccine, either of living or inactivated virus origin. All have type 2 antibodies currently. The seven children in group B who were vaccinated with the SM type 1 strain four to four and one-half years before also retained antibody.

Group C is particularly interesting in that all but one of the 13 infants had transplacental antibody at the time of live virus feeding. Homotypic antibodies were present (table 3) one to two years after 13 of the 14 vaccinations in this group. One infant had lost all detectable type 3 antibody 14 months after feeding. This same child was demonstrated to have a relative "intestinal resistance" to type 3 poliovirus as judged by the low level of virus excretion which occurred after refeeding with Fox strain 19 months after its first administration (table 4). Resistance to intestinal reinfection has been demonstrated by Fox, Sabin, Koprowski, and Horstmann [11] in subjects immunized by both natural and attenuated polioviruses. In the case presented in this paper, intestinal resistance seemed to be independent of the presence of serum antibody.

It is possible that booster infection occurring in nature may have contributed to the maintenance of seroimmunity to the types fed in some of the children. The probability of homotypic natural infection was calculated to be roughly 30%, based on the percentage of tests for heterotypic poliomyelitis antibodies which were positive.

Another method of detecting natural infection is simply by retrospective analysis of antibody titers during the years after vaccination, some of which have been reported previously.[3] In four subjects, one in group A and three in group B, fourfold or greater increases in homotypic antibody titer have occurred since the original response to vaccination. Subject 8 in group A had an increase of type 2 titer from 1:24 at 54 months after vaccination to 1:362 at 71 months. In group B, the type 1 antibody of subjects SC, JC, and Ge changed at 9 to 15 months after vaccination from 1:16, 1:16, and 1:712, respectively, to 1:256, 1:1,024, and 1:4,096 on the next determination. The first of the two specimens from each child was obtained in May, 1955. The second serum specimen was taken in September, 1955, from two of the children (JC and Ge) and in December, 1956, from the third (SC). Since SC is a sibling of JC, and Ge lives in the same cottage, it is possible that a silent epidemic of type 1 poliomyelitis infection occurred in the institution during the summer of 1955.

Despite the question of natural booster infection, it is clear from these results that seroimmunity and intestinal immunity to poliovirus last for years after live-virus vaccination. The median duration of antibodies has yet to be determined but, on the basis of the present study, exceeds eight years. Intestinal resistance to poliovirus has been demonstrated in [illegible] were [illegible] one case for at [illegible] 19 months after vaccination and may [illegible] be a more important criterion of immunity [illegible] than the presence of circulating antibodies [illegible]

In an isolated group of Eski[illegible] antibodies and associates,[1a] t[illegible] who were over 30 years were found [illegible] The data suggested that these antibodies had persisted approximately 35 years in the absence

TABLE 5.—*Presence of Heterotypic Poliovirus Antibodies in 1958 Serums of Subjects Previously Given Attenuated Virus**

Group A				Group B				Group C			
	Type				Type				Type		
Subject	1	2	3	Subject	1	2	3	Subject	1	2	3
2	O	V	O	SC	V	V	+	C 2	V	V	O
5	+	V	+	JC	V	O	O	C 7	V	+	O
7	O	V	O	Bo	V	O	+	C 10	V	O	O
8	O	V	O	T	V	+	O	C 11	V	O	O
9	N	V	O	W	V	N	O	C 14	V	O	O
13	+ (trace)	V	O	Ge	V	O	O	C 26	V	O	[illegible]
14	N	V	+	Go	V	+	O	C 32	V	[illegible]	+
								C 40	V	O	O
								C 46	V	O	O
								C [illegible]	+	V	O
								C 20	O	V	O
								C 34	+	O	V
								C 37	O	+	[illegible]
Totals											
V		7				8				[illegible]	
N		2				1				[illegible]	
+		4				4				[illegible]	
O		8				8				[illegible]	

* Symbols: O = antibody titer <1:4; [illegible] titer ≧1:4; N = natural antibodies before feeding; V [illegible]ted virus of this type previously administered.

[illegible]adiol, [illegible] midcycle [illegible] normal men- [illegible]rage today of ov[illegible] been perfo[illegible] of reinfection. This observation lends support to the theory that seroimmunity will persist indefinitely in most subjects infected with living virus and, coupled with the demonstration that vaccination can be successfully performed in early infancy, gives cause for optimism concerning the usefulness of living attenuated viruses as immunizing agents against poliomyelitis.

Summary

Type 2 poliomyelitis antibody was present in all of seven children approximately eight years after administration of the TN strain of living attenuated poliovirus. Type 1 poliomyelitis antibody was present in all of seven children approximately four years after administration of the SM strain of living attenuated poliovirus. Of 13 infants under 6 months of age at vaccination, 12 retained homotypic antibodies one to two years after feeding of the SM (type 1), CHAT (type 1), TN (type 2), or Fox (type 3) attenuated strains. The only child who no longer had demonstrable antibody to the type originally given was shown to be relatively insusceptible to intestinal reinfection by homotypic virus.

36th and Spruce streets (4) (Dr. Plotkin).

Barbara Cohen gave technical assistance for this study. Dr. Agnes Flack, Clinton State Farms, New Jersey, and Miss Dorothy Mooreby, New Jersey State Board of Child Welfare, assisted in making available the infants vaccinated in this study.

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TRANSPLANTATION OF BONE.—In recent years attention has been centered on transplants or grafts of osseous tissue, largely in connection with the healing of fractures or the filling in of defects in bone structure. There is now general agreement that transplants of fresh autogenous cancellous bone or of bone marrow may survive in the host bed and produce new bone. There is less evidence for the survival and growth of transplants of homogenous bone and little or none for the survival of heterogenous grafts. It is recognized, however, that implants of frozen-, devitalized, or preserved heterogenous bone may lead to production of new bone in the host bed, by induction. Similar results are reported for implants of the decalcified bone and of bone mineral, prepared by removal of organic matter by solution in ethylene diamine.—Franklin C. McLean and Ann M. Budy, Connective and Supporting Tissues: Bone, *Annual Review of Physiology*, vol. 21, 1959.

SIMPLE CHEMICAL METHOD FOR THE DETERMINATION OF OVULATION TIME IN WOMEN

Manessch G. Sevag, Ph.D.
and
Sabin W. Colton, M.D., Philadelphia

The method here proposed for determining ovulation time requires that urine samples be collected nightly between 11 p. m. and 7 a. m. for from five to seven successive nights, beginning with the sixth or seventh day after midnight of the day the first menstrual bleeding occurs. The samples are tested by a special reagent for the presence of chemical substances as yet not fully identified; they give a blue color suitable for colorimetry. The color-yielding substance is a component of a complex containing a derivative of folic acid. Graphing the intensity of the color day by day yields a curve with a characteristic peak; the terminal low value, if it is on either the fifth or sixth day of the pattern, represents the day of ovulation. This hypothesis was tested by applying it to 227 cycles in which conception occurred by isolated coitus or husband or donor insemination. Among a total of 227 pregnancies there were 125 normal conceptions with full-term deliveries resulting from homologous or donor inseminations that afforded a basis for quantitative description of the ovulation pattern.

Various attempts have been made in the past to develop a simple, clinically applicable chemical method for the determination of ovulation time. None of these attempts has been found satisfactory. We report here a simple chemical procedure. The test, in its initial trial period, was compared with the Farris test (for hyperemia in the rat),[1] but no correlation was found. The new test has been applied independently of the rat test with gratifying results.

The test can be performed in any laboratory or medical office by a technician or nurse. One-tenth of a milliliter of daily urine is sufficient for a single test. The urine specimens of as many as 10 patients can be analyzed within an hour by an experienced person. The test has proved particularly useful in determining the ovulation time of patients with infertility problems. It is based on the measurement of the intensities of blue color developed in reactions between specific reagents and chemical entities produced in varying amounts by follicles and/or other organs believed to be stimulated or depressed by gonadotropic hormones during the ovulation cycle. Some information about the possible nature of the chemical entities responsible for the test results has already been obtained, but the discussion of their nature must wait for their final identification as the agents directly responsible for the results.

Procedure

Collection of Urine.—During the collection of urine for this test the patient should avoid drinking any kind of liquid—water, liquor, juices, or soda—and taking any kind of drug after 8 p. m. The urine voided between 8 p. m. and 11 p. m. should not be collected. The patient should collect all her urine nightly between 11 p. m. and 7 a. m. in individual clean, dry bottles and store it in a refrigerator after marking the date on each bottle. In this manner, urine is collected for from five to seven successive nights, beginning with the sixth or seventh d[illegible] after midnight of the day the first menstrual [illegible]ing occurred. From each of the collect[illegible] specimens, about 1 fl. oz. (30 ml.) is tr[illegible] individual clean, dry small bott[illegible] capped, and all the samples [illegible] tha-day for analysis. All the [illegible]nts the should be labeled a[illegible] throughout [illegible] two consecu- [illegible] rch, 1958) a single

of collection, and cycle day. The bottles should be washed with distilled water (iron rust from faucets should be eliminated during washing).

Analysis of Urine Specimens.—Step 1: [illegible] measurement bottles should be invert[illegible] times for u[illegible]n dispersion of the [illegible] sed for 5- [illegible]adiol, ure 0.1 [illegible] rine from each [illegible] midcycle cu[illegible] et of 0.1-or-[illegible] taken [illegible] normal men- [illegible] labeled [illegible] of ovula[illegible]n [illegible] color[illegible] been performed.

[illegible] the series were due to coitus or ended [illegible] miscarriages. Miscarriages are likewise excluded for the reason that it is not clear whether they are due to a too early or too late insemination or to the physiological condition of the subject or the ovum at the time of insemination.

As mentioned above, 53.6% of conceptions occurred according to the five-day pattern of the ovulation cycle and 36.0% according to the six-day pattern. That is, 89.6% of the conceptions occurred

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From the Departm[illegible]
Institute of Anat[illegible]
Farris Inst[illegible]

Step 2: Add to each urine sample in succession 0.5 ml. from each of reagents 1, 2, and 3. Reagent 1 is a 10% solution of pure sodium carbonate; reagent 2 is a 0.1% solution of pure copper sulfate; and reagent 3 is known as Folin-Ciocalteu [2] reagent.

TABLE 1.—*Relation of Percentage of Four-to-Seven-Day Ovulation Cycle Patterns to Cycle Days During Which Conceptions Occurred, Based on 125 Conceptions*

	Patterns, % According to Length in Days				
Day of Conception	4	5	6	7	8
10	...	5.6	0.8	...	...
11	...	7.2	7.2	...	...
12	0.8	10.4	11.2	0.8	...
13	1.6	12.8	7.2	3.2	...
14	0.8	9.6	7.2	0.8	0.8
15	0.8	5.6	0.8	0.8	...
16	...	1.6	2.4	0.8	...
Total, %	4.0	52.8	36.8	6.4	0.8

These reagents can be measured with an ordinary graduated serologic pipet. Wait 10 minutes for the maximum development of blue color before diluting to the 10-ml. mark with distilled water, then mix the contents by inverting the tube with a clean thumb as stopper. Read the intensity of color in a Klett-Summerson colorimeter with filter 560.

Chemicals used for the preparation of reagent 3 must be of high purity. Into a 1.5-or-2-liter flask with ground glass joint introduce 100 Gm. of sodium tungstate ($Na_2WO_4.2H_2O$), 25 Gm. of sodium molybdate ($Na_2MoO_4.2H_2O$), 700 ml. of distilled water, 50 ml. of 85% orthophosphoric acid (H_3PO_4) solution, and 100 ml. of concentrated hydrochloric acid. After attaching a ground glass joint condenser reflux the contents gently for 10 hours. Then add 150 Gm. of lithium sulfate (Li_2SO_4), 50 ml. of distilled water, and a few drops of liquid bromine. Boil under a hood without condenser for 15 minutes to remove excess bromine. After cooling, dilute to 1 liter and filter through good quality paper into a thoroughly cleaned brown glass bottle or bottle adapted for plastic screw cap. The reagent should be stored in the dark and kept away from reducing agents. Before use, one part by volume of this reagent should be diluted with two parts of dis-
strable water in a clean cylinder and stored for daily
diluted serum ss-stoppered or screw-capped brown
Infant C34 rece
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almost invariably occurred the fifth, sixth, or seventh day after the initial low point of the patterns. Considering the random nature of the chemical studies, it appeared significant that a conception rarely occurred on other days than these (table 1). Also, these patients were not forced into a formula which might allow conception by random chance; we are dealing with normal physiological variation as well as the human element in the urine collection.

These conceptions were achieved by isolated coitus, single insemination from husband, or single therapeutic insemination from donor. Primary weight was given to conceptions by therapeutic donor insemination with normally developing pregnancies or normal full-term deliveries. Of the 78 pregnancies used in the initial standardization of the chemical test 22 were in this category.

With the pattern established, the chemical test alone was applied to patients with established fertility problems in an attempt to achieve conception. Also, where the chemical tests were run parallel to the rat tests, if the rat test results appeared erratic or atypical the chemical tests were used as a guide for planned coitus or insemination. Further refinements of interpretation were added as the number of pregnancies accumulated.

Ovulation time was evaluated according to a pattern which is easily recognized by looking over the colorimetric readings of the urine samples from successive cycle days. This pattern extends principally over five or six cycle days. The pattern of the ovulation cycle begins with the lowest colorimetric reading, followed by a gradual rise to a peak, followed by an abrupt, gentle, or gradual drop in the colorimetric readings. This terminal low value, if it is on either the fifth or sixth day of the pattern, represents the day of ovulation. The pattern has the appearance of a triangle, the angle on the left side corresponding to the cycle day of the beginning of the pattern, the vertex to the cycle day of the peak of the pattern, and the angle on the right of the triangle to the cycle day of ovulation. Several representative examples from over 200 pregnancies are given in table 2.

Results

Chemical tests were performed during the cycle of ovulation in 227 cases. Of these 112 conceptions were achieved after the use of the chemical test alone for the selection of the attempt at conception, and 37 conceptions in cases where the rat test was performed but the day of conception was selected from the chemical studies, for a total of 149 concep-
Of the 149 conceptions 33 were from single
eminations, with pregnancy either develop-
or having terminated normally. For
rage number of single donor in-
conception was 2.02, with
rst month of treatment.

This compares favorably with the results achieved by other workers [3] relying on three donor inseminations on alternate days.

It should be pointed out that, from those who are eventually successful, the proportion of those who conceive in the first month is considered to be the most useful measure of insemination efficiency. In the group compared by Potter [3] the proportion of first-month pregnancies varied between 31 and 46% as against 54.5% in our series on the basis of a single insemination. Even in the most successful of the series reported by Potter, basal body temperature readings and occasional vaginal smears were employed. In this same group of 33 patients 6.1% conceived on the fourth day, 57.6% on the fifth day, 33.3% on the sixth day, and 3.0% on the seventh day from the initial low point of the chemical pattern. These values are comparable to the following percentages of conceptions: From 125 patients who conceived 4.0% had a four-day pattern length; 53.6%, five-day; 36.0%, six-day; and 6.4%, seven-day.

Tᴀʙʟᴇ 2.—*Representative Examples of Ovulation Cycle Patterns**

Cycle Day	Day of Pattern Peak: 2nd	3rd	4th	5th
Typical Five-Day and Six-Day Patterns				
6........	350	350	460	...
7........	260†	460	290†	...
8........	330‡	290†	310	...
9........	290	310	360	...
10........	260	360‡	400‡	...
11........	200§	330	350	...
12........	...	280§	270§	...
Examples of Acceptable but Less Uniform Patterns‖				
6........	600	440	90	120
7........	470	300†	80†	150
8........	260†	320	180	120†
9........	620‡	610‡	100	380
10........	400	350	230‡	240
11........	520	400§	120	480‡
12........	400§	...	170§	540‡
13........	...	...	...	240§

* Deviations = ± 25 from "normal" pattern. Consider height and range of values for individual pattern.

† Beginning of ovulation pattern.

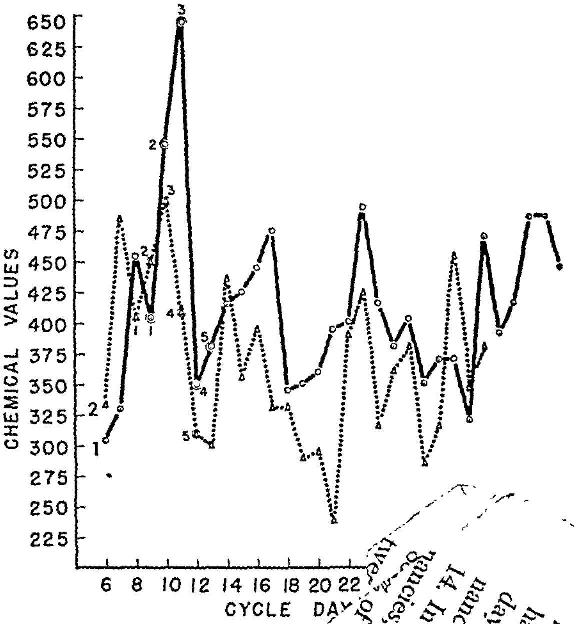
‡ Peak days.

§ Ovulation day for insemination or coitus.

‖ Inseminations were on 5th and 6th day, in accordance with established patterns, even though 5th and 6th day values occasionally were slightly higher than ones immediately preceding. It is possible that more uniform and precise patterns might be obtained if, instead of single r samples collected within period 11 p. m. t within each period were kept and analyze re elaborate procedure might result in obtaining sharper initial low points, pattern peaks, and last ovulation day within each pattern. Theoretically and clinically such a procedure might be desirable.

Two patients who required pelvic surgery for bilateral tubal obstruction had laparotomies in conjunction with the chemical test. In one patient, whose operation was performed on the predicted day of ovulation, a recently ruptured Graafian follicle was observed; in the other, whose operation was performed the day after the selected day of ovulation, a recently organized corpus haemorrhagicum was observed. The figure represents the chemical values for the same patient throughout the whole cycle from cycle day six for two consecutive cycles. In the first month (March, 1958) a single donor insemination was performed unsuccessfully. In the second month (April, 1958) the procedure was successful. The fluctuations in the chemical values in the two cycles are comparable to the higher values achieved in both instances during the preconception period. It should also be noted that the insemination was performed on the fourth day in the unsuccessful cycle, but on the corresponding fifth day in the successful cycle.

From the group total of 227 pregnancies 125 normal conceptions with full-term deliveries resulting from homologous and donor inseminations were used as a basis for the following calculations. Pregnancies due to coitus are not included for the reason that the exact day of coitus responsible for conception may be uncertain. The remaining pregnancies in the series were due to coitus or ended as miscarriages. Miscarriages are likewise excluded for the reason that it is not clear whether they are due to a too early or too late insemination or to the physiological condition of the subject or the ovum at the time of insemination.



Chemical values for same p
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tained if hourly ur eported finding a midcycle
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on which insemination shoar 24 ho been performed. ay of ovula

As mentioned above, 53.6% of conceptions occurred according to the five-day pattern of the ovulation cycle and 36.0% according to the six-day pattern. That is, 89.6% of the conceptions occurred according to five-day and six-day patterns. The remaining 10.4% occurred according to four-day and seven-day patterns. These are borderline patterns, and it may eventually be possible to group them with the others. These patterns are consistent *with the known period of stimulation and maturation* of the Graafian follicle. If the distribution of conceptions on cycle days is determined, it will be observed (table 1) that 79.2% of conceptions occurred on cycle days 11 to 15, according to five-day and six-day ovulation patterns.

Table 3.—*Interrelation of Number and Percentage of Conceptions to Percentage of Each of Pattern Peaks Within Each of Four-to-Seven-Day Ovulation Cycle Patterns, Based on 125 Conceptions*

Conceptions		Day of Peak	Patterns Peaks, % According to Length in Days				
No.	%		4	5	6	7	8
26	20.8	2	3.8	65.4	27.0	3.8	...
50	40.8	3	4.0	76.0	18.0	2.0	...
35	28.0	4	5.7	25.7	54.3	14.3	...
9	7.2	5	...	22.2	66.6	...	11
5	4.0	6	...	...	80.0	20.0	...

The results in table 3 show that in 89.6% of conceptions the observed peaks fell on the second, third, and fourth day of the ovulation patterns. Of these conceptions 40.8% occurred in patterns having the peak on the third day. Of the 26 conceptions occurring in patients whose patterns had second-day peaks, 65.4% were in patients with five-day ovulation patterns; 76.0% of 50 patients who conceived whose patterns had third-day peaks had five-day patterns; and only 25.7 of 35 patients who conceived who had their peaks on the fourth day had five-day cycles. From the standpoint of the mechanism and physiology of ovulation these differences are noteworthy.

If we analyze the results in a slightly different
a thе nner, we find (table 4) that ovulation patterns
adapted their peaks on the second, third, and fourth
be stored in tively, show the occurrence of preg-
agents. Before usnantly during cycle days 11 through
1: gent should be di1.6% of second-day peak preg-
rable anter in a clean cyday peak pregnancies, and
iluted serumss-stoppered or gnancies occurred be-
Infant C34 rece
en cycl
The variation of ulation Tom the second to the fourth day brings out a new phenomenon which may mean either that certain follicular systems are more reactive to the stimulating agents or th the quantities of these agents are produced in differe amounts in different ovulatory systems. The question of whether or not the relation of peaks to patterns varies from month to month in a given subject remains to be determined; however, in an individual patient in successive months the patterns are, in general, either consistently uniform or consistently irregular.

On the basis of the above-discussed results, the following considerations are evident: 1. Irrespective of the variation of the day, the peaks following the low point are the essential parts for the determination of the ovulation patterns and thereby the *predicted day of ovulation.* 2. *Irrespective of the variation* of the days on which the peaks were observed, 90% of conceptions occurred according to five-day and six-day long ovulation patterns. 3. Linked with 1 and 2 is the fact that 96.2% of conceptions occurred in patients with patterns having peaks on the second, third, and fourth days, on cycle days 10 to 15. Of these conceptions 50% occurred on cycle days 12 and 13.

Comment

The basic question in regard to the nature of the substances responsible for the results of the chemical test, particularly those underlying the occurrence of peaks during the ovulation cycle, cannot at present be answered. Preliminary tests show that the treatment of urine samples with weak acids and/or weak alkali with or without heating does not affect the test results. Chromatographic studies likewise show that none of the amino acids is responsible for the results. The presence of a certain class of substances collectively or individually responsible can, however, be conjectured. Of this class the flavonoids in urine need to be considered. They are biologically active substances which are invariably taken into the system in the form of seeds, vegetables, and fruits and are encountered in urine in their modified or original forms. A number of these substances have been estimated as to their potency for color development (table 5). Whatever may be the nature of the urinary substances responsible for the color developed in 0.1 ml. of urine, during the ovulation cycle there is a definite increase in colorimetric readings which is responsible for the critical peaks in the chemical patterns.

Table 4.—*Relation of Percentage of Pattern Peaks to Cycle Days During Which Conceptions Occurred (Based on 125 Conceptions)*

Cycle Day	Peaks, % on Day of Pattern				
	2nd	3rd	4th	5th	6th
10	7.7	8.0	5.7	...	...
11	15.4	14.0	8.3	33.3	...
12	31.6	20.0	22.8	33.3	40.0
13	15.4	24.0	31.4	11.1	...
14	19.2	18.0	20.7	11.1	40.0
15	7.7	10.0	5.7	11.1	...
16	...	6.0	5.7	...	20.0
No. of Conceptions	26	50	35	9	5

The extraction from the thymus gland of a yellow
nobstance with characteristics similar to the flavo-
of thehas been reported, suggesting the possibility
animal sysence of flavonoids as components of the
following acu[4] In a symposium on flavonoids the
scribed[5]: Flavo in the animal system were de-
inhibit succinoxidase via

the sulfhydryl group, choline acetylase, hyaluronidase, oxidation of ascorbic acid and epinephrine histidine decarboxylase, and release of histamine; they interact with different metabolites and enzyme systems linked with the regulation of capillary permeability by reducing fragility; and they act synergistically in the body with ascorbic acid. Other participants in this symposium reported that the flavonoid quercetin regulates the sexual process of the unicellular alga Chlamydomonas eugametos. l-Phenylalanine, 3,4-dihydroxyphenylalanine (dopa), meso-inositol, and 3,4-dihydroxycinnamic and 3,4-dihydroxyphenylpropionic acids function as precursors for the formation of quercetin. The naturally occurring isoflavonoids are estrogenic. In plasma vitamin C deficiency associated with decidual hemorrhage and spontaneous abortion a fruit diet rich in vitamin C and hesperidine has been stated to exercise a therapeutic effect, and a combination of vitamin C and flavonoids has been used in treating impaired capillary functions and capillary bleeding.

It has been reported that urine of 13 of 16 normal women showed the highest vitamin C level on the 12th to 18th days of the menstrual cycle, and the day of ovulation was denoted by an 80 to 100% decrease in the vitamin C content.[6] A relationship between the elimination of ascorbic acid in the urine and the basal temperature curve has been reported in a series of 32 women.[7] In 62.5% of the series the decrease in the excretion of vitamin C coincided with the characteristic drop in basal temperature. The menstrual period was characterized by poor elimination of vitamin C. In this connection it may be added that the lowering of ascorbic acid by norepinephrine is five times that by epinephrine.[8]

Epinephrine and a number of derivatives and precursors (table 5) are reported to be present in urine in appreciable amounts. 3-Methoxy-4-hydroxyphenylacetic acid[9] and 3-methoxy-4-hydroxy-D-mandelic acid[10] are major metabolites of norepinephrine and epinephrine. Dopa, dopamine, and 3,4-dihydroxyphenylpyruvic acid are reported to be the precursors of epinephrine.

In relation to ovulation time the interrelationship of platelets and epinephrine is noteworthy. It is reported[11] that the platelets consistently reached their highest levels during ovulation, as determined by basal body temperature graphs. In midcycle the levels of platelet counts usually rose suddenly and dramatically within 24 hours to reach the highest point during the entire cycle. Within another 24 hours the platelets returned to their previous levels and remained constant or decreased gradually until the onset of the next menstrual period. It was reported that the thermal shift coincided with that of the platelets. In view of the accepted facts that the basal temperature shift from the low to the high phase is indicative of ovulation and that ovulation may immediately precede or follow the temperature shift, Pepper[11] suggested that the platelet peak may be coincidental with ovulation in the vast majority of menstrual cycles.

Blood platelets are carriers of epinephrine and norepinephrine,[12] and they harbor 5-hydroxytryptamine.[13] It has also been reported that plasma epinephrine undergoes rapid and extensive changes in response to the injection of various hormones and drugs.[12] It was found that the injection of 20 units of ACTH daily foı three days in four normal subjects resulted in a decrease in the excretion of norepinephrine but little or no change in excretion of epinephrine.[14]

TABLE 5.—*Colorimetric Values of Substances, Some of Which May Be Present in Urine*

Substance	Molecular Weight	Mcg./Ml. Reaction System	Color Readings*
Miscellaneous			
Estrone (piperazine estrone sulfate) †	270.36	4.2	186
Thyroxin	798.90	1.8	252
Sodium Liothyronine	672.0	1.5	352
Serum albumin, crystalline	...	50.0	192
Ascorbic acid	176	4.0	239
Tyrosine	181.10	4.1	296
p-Hydroxyphenylpyruvic acid	180	4.0	330
Hydroxyproline	131.0	3.0	13
Flavonoids			
4-Methylesculin	192.00	1.0	202
3,4-Dihydroxychalcone	240.25	1.24	155
Genistein	260.00	1.24	150
Epicatechin	362.00	1.84	240
Quercetin	302.23	1.56	480
Naringin	580.33	2.90	88
3,3,1,4-Tetrahydroxychalcone	282.25	0.30	111
Hesperidin	610.55	3.20	170
Rutin	610.51	3.20	335
Hesperidin-methylchalcone	624.00	3.24	35
Phenyl and Indolalkylamines			
α-Indole-3-n-butyric acid	203.23	4.6	194
β-Indole-3-propionic acid	189.23	4.3	155
Indole-3-acetic acid	175.23	4.0	294
5-Hydroxy-indole-3-acetic acid (Cyclohexamine Salt—mol. wt. 290.4)	191.23	1.32	208
5-Hydroxytryptophan	219.23	1.0	165
Tryptophan	204.11	4.6	106
5-Hydroxytryptamine (Creatinine Sulfate—mol. wt. 373.35)	162.00	0.74	141
Epinephrine	183.11	0.83	215
Parahydroxyphenylethylamine Hydrochloride (mol. wt. 173.56)	137.18	0.80	187
Tryptamine Hydrochloride (mol. wt. 197.00)	160.00	0.73	142
Dihydroxyphenylalanine (dopa)	197.00	0.90	240
Dopamine Hydrochloride (mol. wt. 189.54)	153.19	0.86	252

* Klett-Summerson colorimetric readings, filter no. 560.

† 5% sodium carbonate solution tested after 48 hours at room perature.

A team of investigators[15] at the Univer The Edinburgh, measuring combined estrone, estradiol, and estriol excretion, reported finding a midcycle ovulatory peak in eight women with normal menstrual periods in whom the average total estrogen excretion was 56 mcg. per 24 hours. In view of the high colorigenicity (the property of a substance to yield a color in a reaction system) of epinephrine and related substances, and despite the low colorigenicity of estrone (table 5), the interaction of hormones and vitamins such as epinephrine, gonadotropic hormones, vitamin C, and flavonoids is evident.

Eventually it may be possible to correlate the sharp increases in urinary estrogen levels, the platelet peaks, and the known basal temperature shifts with the second, third, and fourth day peaks observed by our chemical test in establishing ovulation cycle patterns for the further understanding of the physiology and chemistry of the ovulation cycle. Epinephrine and related substances may be responsible for the peaks we have observed and also may account for the platelet peaks and increases in estrogen output.

From the standpoint of characterizing the mechanism of the physiology of ovulation and reproduction we feel that we have a new simple tool to determine the nature of factors responsible for the chemical ovulation patterns. The following observations have recently been made: Folic acid derivatives present in 1 ml. of urine yielded a pattern paralleling the chemical ovulation pattern. Chlorides and para-aminobenzoic acid in these urine specimens have no correlation to the above patterns. Chromatograms of 0.1-ml. urine specimens show one main spot and at least two minor spots. In butanol–acetic acid–water solvent (50:25:25 by volume) the main spot has Rf value of 0.33, and one of the minor spots has Rf value of 0.86. The latter gives a positive ninhydrin reaction. In isopropanol–acetic acid–water (25:1:74 by volume) solvent the Rf of the main spot is 0.57. This substance has 284 mμ λ maximum and 254 mμ λ minimum. A similar compound is present in the male urine. The colorogenic main spots of both the male and female urine specimens have citrovorum factor activity. It would seem that the main spots are large molecules composed of a colorogenic substance, citrovorum factor, and possibly of other unknown substances. The hormonal, enzymatic, and chemical natures of these substances are being investigated.

We feel that the chemical ovulation patterns are completed with the beginnings of the chemical patterns corresponding to the ovulatory stimulation of follicles and the rupture of the Graafian follicles with the liberation of ova. Characterization of entities in the urine during this period would be expected to throw new light on the reproductive mechanism.

Summary

A simple chemical test based on color development, applied to first morning urine specimens for the prediction of the day of ovulation, was applied to 227 cycles in which conceptions occurred by isolated coitus or husband or donor insemination. In most instances a uniform, triangular five, six, or seven day pattern of chemical values afforded a basis for prediction of the day of conception. Of the 227 conceptions 149 were based solely on the chemical test predictions. Of patients who had single donor inseminations 54.5% conceived the first month of treatment. It took an average of 2.0 cycles for conceptions to be achieved in this group.

Thirty substances, hormones, vitamins, and chemicals, are analyzed by this test for their colorigenicity. Several of these may be factors responsible for the color developed in 0.1-ml. urine samples. Attention is called to the possible role of catecholamines and, particularly, epinephrine, norepinephrine, and related substances. There appears to be a close relationship among the peaks of platelet counts, estrogen output, and the colorimetric values which were observed in the present work, suggesting that in time a common causal factor may be found.

1930 Chestnut St. (3) (Dr. Colton).

George B. Koelle, M.D., Ph.D., Professor of Pharmacology and Dean of the Graduate School of Medicine, University of Pennsylvania, supplied many of the phenylalkylamines and indolalkylamines used in this study. Gustav J. Martin, Sc.D., Director of Research, National Drug Co. Research Laboratories, Philadelphia, contributed flavonoids; Abbott Laboratories, North Chicago, Ill., contributed the sample of piperazine estrone sulfate; and Smith, Kline & French Laboratories, Philadelphia, contributed the samples of thyroxin and sodium liothyronine.

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CRITICAL EVALUATION OF THE PSORALENS

Harry Pariser, M.D., D.Sc., Norfolk, Va.

Opinions as to the usefulness of the psoralen group of drugs in treating vitiligo were obtained by questionnaire from 100 dermatologists in various parts of the world. Two dermatologists were enthusiastic about the systemic use of the psoralens, eight were vehement in their condemnation, and most considered the results poor. Systemic use of the psoralens caused a wide variety of disagreeable signs and symptoms such as nausea, vomiting, gastric burning, dermatitis, rectal bleeding, albuminuria, and jaundice. Animal experiments demonstrated eye damage (cataracts) and the development of tumors through probable photosensitizing factors. The psoralens are presumed to enhance tanning and increase resistance to sunburn. The use of drugs of such potential toxicity for what is primarily a cosmetic problem should be deplored. In those instances in which tanning is medically desirable, the results have been equivocal.

The Egyptians, since the 13th century, have been using for medical purposes the powdered fruit of the *Ammi majus Linn*, a plant found abundantly in the Nile Valley. Recently this plant has been identified as a member of the parsley family and is known in the United States as bishop's-weed, which grows in the western part of the country. Reputedly, use of these agents, the psoralens, resulted in pigmentation of vitiliginous skin, but side-reactions caused were nausea, vomiting, diarrhea, severe vesiculation, exfoliative dermatitis, and even coma. For a condition such as vitiligo, which was previously regarded as having no treatment of even minor helpfulness, such reports deserve investigation. Who knows but that from the ancient lore, whence came ephedrine, digitalis, and Rauwolfia, another drug may be emerging. The preparations, originally designated as ammoidin, ammidin, and majudin, were found to be identical, respectively, to the known compounds xanthotoxin, imperatorin, and bergapten [1] and are now designated as 8-methoxypsoralen, 8-isoamylenepsoralen, and 5-methoxypsoralen. The first of these is regarded as the most active,[2] the second is practically inactive, and the third is only moderately active photodynamically.[3] The generic name methoxsalen has been given to 8-methoxypsoralen.

The first scientific report on this subject, by el Mofty, appeared in the *Journal of the Royal Egyptian Medical Association* in 1948.[4] He republished his findings in English in the *British Journal of Dermatology*.[5] The psoralens were used orally, locally, and intradermally. A dose of ultraviolet light was given once or twice a week after the lesions were painted with solutions that were of varying concentrations. Response to treatment was noted in about three to six weeks and consisted of tiny hyperpigmented follicular spots and hyperpigmented growth from the edges. El Mofty stated that 5 of 15 patients were considered cured, 5 achieved a good response and 1 a partial response, and there were 4 failures. Five whose conditions were resistant to oral treatment showed response to intradermal therapy but none completely so. Of these, two showed response only after intradermal injections were supplemented by oral medication. Control areas treated with topical medication alone, ultraviolet light alone, or intradermal injections alone did not respond. Therefore, he concluded that results depend on a source of light changing the compound into a form which stimulates melanogenesis. Kanoff[6] subsequently confirmed this. Sidi,[7] in an attempt to evaluate intradermal therapy, found this mode of treatment very painful as well as ineffective in three of four patients.

Since the original report, many others have appeared. All the authors have used essentially the same over-all technique or attempted to evaluate one phase of the treatment. For example, some used varying doses of orally given medicaments, others varied the concentration of locally applied medicaments, and still others combined the local and systemic medication.

Although the classic approach to the discussion of a problem is a brief review of each article on the subject, I prefer to depart from this method and to discuss and, to some extent, evaluate the techniques used as reported in the literature. The discussion will be divided into evaluation of local treatment, systemic treatment, and combined treatment. In both local and systemic treatment, including "paired comparison," it is generally agreed that ultraviolet light (preferably sunlight) enhances the effect. The effective wave lengths appear to be between 2,500 A and 4,077 A.

Local Treatment

Those investigators using local treatment concerned themselves with varying the vehicle (cream or solution), the composition of the diluent, the concentration and composition of active ingredients, the frequency of application, the time interval between local applications of the medicament, and the use of subsequent irradiation. From this emerges a fairly standardized technique which consists of

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Read at the McGuire Memorial Lecture Series, Medical College of Virginia, Richmond, Nov. 13, 1958.

first treating with a low concentration of the medicament (about 0.1%) and gradually increasing the concentration to tolerance point (usually not above 1%). The vehicle selected appears to make very little difference provided the active medicament is dissolved or uniformly suspended. The time interval of two to four hours between applications of the solution and the use of daily irradiation appears to give the best results. Some authors feel that the medicament should be washed off before ultraviolet irradiation is given, since the drug tends to filter out some of the rays. Exposure to ultraviolet light or sunlight must be as short as 5 to 10 seconds in the early stages of treatment and gradually increased in relation to tolerance, probably never much over 20 to 30 minutes. Uncontrolled sun exposure almost always results in severe reaction.

A limiting factor in the wide acceptance of this mode of therapy is a rather severe local toxic reaction which appears in practically all cases. This consists of swelling, blistering, oozing, and considerable associated pain, followed by marked scaling, pruritus, and hyperpigmentation. Occasionally, eczematization, ulceration, and even exfoliative dermatitis are also noted. Increased sensitivity to sunlight may persist for months without further application of 8-methoxypsoralen.[3] These reactions are often severe enough to incapacitate the patient completely for several days, particularly if the ultraviolet light dosage is uncontrolled.

Most authors agree that the degree of repigmentation is not dependent on the degree of reaction, since repigmentation has occurred with no reaction and has, at times, failed to appear after severe reaction. However, it is true that most patients who achieve repigmentation do so after severe reaction.

Systemic Treatment

The evaluation of systemic administration of the psoralens was concerned primarily with using varying percentages of the different psoralens and experimenting with varying doses. At present, the technique, after considerable trial and error, consists in administering 10 mg. orally three times daily or 20 mg. once daily. This is followed in two to four hours by daily use of ultraviolet light (sunlight if possible). Intervals of rest from the drug are advised by some. Again, most authors note that repigmentation is independent of the severity of the reaction. It is difficult to determine from the literature whether 8-methoxypsoralen alone is superior to combinations of drugs; certainly the effect is not statistically apparent. Sunlight exposure should be short, that is, 5 to 10 seconds at first with gradual increase to maximum tolerance. A protective cream should be used between ultraviolet exposures.

In the literature many[8] claim the superiority of local treatment over systemic therapy; others[9] report equally satisfactory results from systemic treatment alone. However, the marked reaction to be anticipated from local therapy eliminated to a large extent its wide acceptance except in use for small patches of vitiligo. At present the place of the psoralens in medical therapy largely depends on the effectiveness of systemic use combined with sunlight or ultraviolet light and on toxicity after systemic administration.

Evaluation of Treatment

Before evaluating any drug, one should know certain variables concerning the natural course of the disease for which it is used. Apparently there is no report concerning the frequency of spontaneous repigmentation in vitiligo, although I have noted it and it has been reported by others. I have also, on occasion, been able to note repigmentation after frequent local application of concentrated phenol to small patches of vitiligo or after the use of oil of bergamot followed by ultraviolet light, both procedures considerably less painful and less toxic than the use of 8-methoxypsoralen. It is not at this time evident whether there was a cause and effect in these procedures or whether spontaneous repigmentation occurred in these patients during the observational period of 8 to 15 months.

It is well known that hyperpigmentation often and depigmentation occasionally occur after a marked degree of inflammatory reaction in Negroes. Most authors using the psoralens noted that Negroes tend to respond more readily than Caucasians and children better than adults. Lesions of the face and trunk respond better than those of the mucous membrane, hands, and feet. Repigmentation practically never occurs in the genitalia. Lesions of recent origin respond better than those of long duration.

The over-all results obtained by authors varied so widely that evaluation is quite difficult. For example, in THE JOURNAL,[10] in November, 1955, is a statement that satisfactory results can be obtained in 30 to 40% of patients treated orally, 50 to 60% of those treated topically, and 80 to 95% of those treated by the combined methods. This observation was based on 200 recorded cases to date in the American and Egyptian literature. Sidi[7] reported significant repigmentation in 84% of 106 patients given oral treatment. Elliott,[11] in 1956, noted that 18 of 22 patients showed significant repigmentation by combined treatment and that the 4 who showed poor response had failed to cooperate properly. Levai[12] indicated that 54% of his patients who stated they had had previous skin trouble at the sites of their vitiligo and 68% without such difficulty achieved 95 to 100% repigmentation. Srivastava,[13] as well as Kelly,[14] indicated that 25% of their patients showed complete repigmentation, the former using combined and the latter local treatment. On the other hand, Sulzberger and Lerner,[15] in a recent article, reported that only 14% of patients achieved a satisfactory repigmentation, and Kanoff,[16] working on a large number of cases at the Skin and Cancer Hospital, as well as in his private practice, wrote that only 10% obtained a cosmetically acceptable repigmentation.

One must realize that the definition of satisfactory is relative, since some have regarded as satisfactory any repigmentation and others only significant [illegible] from a cosmetic point of view, a small or even a significant amount of repigmentation often does not enhance the appearance. In my own series of 17 patients treated orally with doses of 10 mg. three times daily followed by weekly exposure to ultraviolet light, no patient achieved more than 50% repigmentation and, in most instances, less than this or nothing. Topical applications were abandoned after severe reaction in three patients without any significant response in any of them.

To evaluate this wide discrepancy in results, I sent a questionnaire to 125 dermatologists. A total of 100 replies were received from these men, who practiced in both small and large communities throughout the world; they varied from professors of medical schools to those with no academic connections at all. Twenty-four dermatologists did not use the drug for various reasons, mostly because they were afraid of the toxic effects. Only two dermatologists were enthusiastic about the systemic use of these compounds; one took them himself and gave them to his 4½-year-old daughter. Eight were vigorous in their condemnation of the use of these drugs, which they regarded as producers of serious reactions. Practically all others commented that their results were so poor as to show that while these psoralens might indicate an advance in the treatment of vitiligo they are certainly far from the answer. The breakdown in results is shown in the table.

Repigmentation After Use of the Psoralens

Method of Treatment	Cases, No.	Number Achieving Repigmentation				
		100%	75%	50%	25%	0%
Local	231	10	4	5	152	60
Systemic	999	31	6	286	338	338
Combined	113	0	0	17	55	41

It is rather interesting that all of the cases of complete or almost complete repigmentation were reported by 8 of 76 dermatologists who used the drug. All the rest reported 50% or less repigmentation in all their cases. In the present survey of the largest series reported to date, a really satisfactory result was obtained in 7.4% of 1,343 patients and in only 3% of 999 who were treated systemically. Admittedly there is a margin of error in a questionnaire type of report, but the large number of cases and the fairly consistent effects obtained by the majority of dermatologists perhaps reduce this error to statistical unimportance. Fitzpatrick, who is one of the leading authorities on pigment metabolism, reported at a recent meeting of the American Dermatologic Society that two to three years ago he had 150 to 200 patients under such treatment but during the past year only 4, a fact which would certainly indicate waning enthusiasm.

Sulzberger[15] stated that treatment response, even in the same individual, is erratic and that one course may give satisfactory results but on repetition may fail to do so. Treatment may have to be extended over a period of years. Many have commented that even during treatment new vitiliginous patches may appear and when therapy is discontinued the patient often relapses to the pretreatment status. When repigmentation occurs it often does so symmetrically.

Reactions

Immediate reactions reported with systemic use of the psoralens consist of nausea, vomiting, headache, gastric burning, excessive sweating, local redness, increased nervous tension, urticaria, oral and rectal bleeding, and albuminuria. Contraindications to systemic treatment are given as nephritis, hepatic insufficiency, diabetes, gastrointestinal abnormalities, hypertension, and cardiac disease.

During the early evaluation of these drugs, the investigators noted abnormalities in the cephalin flocculation and thymol turbidity liver function tests. However, Fitzpatrick,[17] in a later evaluation of these tests, felt that they were inadequate indicators of the potential liver damage caused by these drugs. He stated that the sulfobromophthalein test is the best indicator and, while he would hesitate to conclude that the drugs are safe for general use, he believed that the likelihood of hepatic damage has been overestimated.

Elwi[18] reported that animals who died of an overdose of 8-methoxypsoralen showed at autopsy pronounced changes in the adrenal glands, congestion and rupture of the sinusoids, total lipid exhaustion, degenerative changes of the liver, and some cloudy swelling and glomerular congestion of the kidneys. O'Neill and co-workers[19] noted that mice receiving intraperitoneal injections of 8-methoxypsoralen one hour prior to ultraviolet exposure exhibited severe erythema and an incidence of ear tumors of almost 100% as compared to 68% in a control group. Interestingly, the incidence of tumor development was less in the treated group than in the control group, to whom the drug was administered orally. Griffin and workers[20] have noted that with exposure to long-wave ultraviolet light, which is normally harmless, erythematogenic and carcinogenic effects were obtained with prolonged administration of the psoralens to white mice. Also, there was a high incidence (20%) of cataracts in the treated group but none in controls. They postulated that the slight long-wave ultraviolet emission from ordinary fluorescent lamps may possibly be sufficient to activate such changes if the animals are sensitized by the psoralens.

Rothman, in discussion, stated that if the long ultraviolet wave lengths (>3,650 A) which are emitted by sun and also by artificial fluorescent lights in offices acquire biological effectiveness through increased photosensitization and the potency of producing cancer and cataracts, dermatologists should take a strong stand against their use. Fitzpatrick stated that the production of cancer under the experimental conditions used by Griffin has little application to the problem in man. He felt that conditions are not comparable, in that the dose given was far in excess of that used in man and the intensity and duration of long-wave ultraviolet light was of a degree quite impossible to obtain in sunlight. He further stated that he was unable to produce eye damage in albino guinea pigs by giving large doses of psoralens orally in conjunction with daily exposure to long-wave ultraviolet light over a period of nine months. Knox, however, pointed out that a man taking psoralens can be burned by the normally harmless Wood's light, as demonstrated by photographs of Stegmaier, and, consequently, that some of the findings in experimental animals are transferable to man. It would thus appear that final evaluation of the toxicity of this drug (which has to be taken over long periods of time and in repeated courses) is far from complete.

In the questionnaire two dermatologists reported jaundice within several weeks after oral administration of 8-methoxypsoralen had been started, and five reported abnormal liver function tests. Other unusual reactions noted were vertigo, pruritus vulvae, toughening of the nails, and appearance of eczematoid psoriasiform plaques only in areas of vitiligo. One dermatologist used 8-methoxypsoralen, with no undesirable effect, in two patients who had had hepatitis previously.

The mechanism of the action of the drug is unknown. Lerner states that there is no effect on the tyrosine pigment system unless possibly as sulfhydryl inhibition. Becker,[21] who studied histological changes in normal subjects who ingested 20 mg. of the drug daily followed by ultraviolet exposure, found that the most prominent change in the skin was a thickened, horny layer, resulting in an extremely compact layer and the formation of a stratum lucidum which is usually found only on the palms and soles. Becker feels that the natural exfoliation is thereby cut down and the pigment granules which normally are cast off are retained. The skin is thereby darkened and more responsive to ultraviolet stimulation. This type of change has been noted in the skin in general as a protective mechanism against solar dermatitis. Jarrett[22] noted that the melanocytes are present in the achromic patches of vitiligo but fail to be stimulated to produce melanin by ultraviolet light. Many other theories have been advanced concerning pathogenesis, but none has been experimentally proved.

Tanning Effects

During the course of the evaluation of the psoralens in vitiligo, another possible effect was reported—the ability to increase the tanning capacity of the skin. Lerner[23] noted that three of nine patients reported an increased tolerance to sunlight after oral administration of the drug. He then gave the drug to three albinos, who also believed that it conferred protection against the sun. Fitzpatrick[24] noted augmented tanning effect in patients taking up to 30 mg. per day two hours before sun exposure; but with doses over 30 mg. all the responses, that is, not only tanning but also erythema and blistering, tended to be augmented. Arnold[8a] believed that the chief value of the psoralens may well be their ability to facilitate suntanning and thereby to protect against sun-induced disabilities.

Daniel, Hopkins, and Fitzpatrick,[25] in an attempt to evaluate this possible tanning action, conducted a double-blind controlled study of burning and tanning effects in the summer. By random sampling one-quarter of their patients were given placebo, one-quarter active drugs, one-quarter placebo followed by active drugs, and one-quarter active drugs followed by placebo. A high percentage of patients were blue-eyed blondes. The 106 patients studied were unable to discriminate significantly between lactose placebo and 8-methoxypsoralen, as to both their sunburning and their tanning effects. Oddly, some examining physicians who did not know they had been giving placebo were enthusiastic about response. Here are a few comments from these physicians: "Tanner than ever," "Stayed out whole days without burning," "Increasing exposure and increasing drug dose without effect except more tan and no burn," and "wonderful." With masterful understatement, the authors conclude that perhaps the "testimonial" type of reporting has a high inherent error. Tanning effects apparently need to be studied by more objective criteria.

Since the toxic and photodynamic effects are as yet incompletely evaluated, it seems premature to use these drugs purely for cosmetic tanning. Certainly the statement of a pharmaceutical company that "thousands of physicians have employed these products for this purpose . . . without undesirable effects" is misleading.

Because of the reputed tanning effect, others have attempted to use the psoralens for conditions in which protection against the sun's rays is desirable—for example, in light-sensitive eruptions. No consistent results have been noted. In the questionnaire, good results were reported by one dermatologist in 3 of 5 cases of polymorphic light sensitivity and by three dermatologists in a total of 19 cases of various types of photosensitivity. It was used by 14 other dermatologists for a wide range of eruptions known to be aggravated by sun, with indifferent results. One noted a flare-up in a patient with polymorphic light sensitivity, and Elliott[11] reported two cases of this type of eruption in patients under treatment. Nine dermatologists reported on their use for the promotion of cosmetic tanning on an indefinite number of persons. Five stated that they felt there was a definite tanning effect; four felt that the patients were more impressed than they were. Many commented that they felt this drug should not be given for the tanning effect only since its safety is not completely evaluated.

Savitt[26] reported on its local use in alopecia areata and felt that the patch treated with the drug responded faster than comparable patches treated with phenol alcohol. Sidi[27] felt that favorable response was obtained by oral administration. Sulzberger wondered if a combination of the steroids and psoralens systemically might enhance the regrowth of hair in alopecia areata.

Conclusions

The toxic reactions in animals and the incomplete evaluation of toxic effects in humans certainly should strike a note of caution. Widespread and indiscriminate administration should be deplored and regarded as premature, since there are so many unanswered questions.

What will be the effect of increased sunlight exposure itself on increasing the incidence of carcinoma? Will the drug itself decrease or increase the development of skin cancers since both effects can be obtained by varied administration in animals? Will the "aging process of the skin" be accelerated or delayed? Will the increased melanogenesis activate junctional nevi or enhance the growth of melanomas? What are the harmful effects of long-term administration of these drugs on the gastrointestinal tract, liver, and kidneys and in humans with chronic disease or disability? How close to the 3% "cure" rate in vitiligo is the spontaneous cure rate? Do these drugs really increase tanning, and, if so, will those people who thereby expose themselves to sunlight be more subject to those afflictions to which excessive sun exposure makes them prone? Until these and undoubtedly other questions are answered, extreme caution should be exerted and the use of these drugs should be limited to experimental study.

708 Medical Arts Bldg. (10).

Note: A list of references may be obtained from the author on request.

ALTERED PROGNOSIS WITH CARDIAC MASSAGE

CARDIAC RESUSCITATION IN ACUTE MYOCARDIAL INFARCTION—REPORT OF TWO SUCCESSFULLY TREATED CASES

Stewart N. Nickel, M.D.
and
Henry H. Gale, M.D., Detroit

In two instances patients with previous symptoms of myocardial infarction collapsed suddenly and became pulseless. Artificial respiration was given by insufflation, and immediate thoracotomy was performed to permit rhythmical manual compression of the heart, which was in a state of asystole. Intracardiac injection of 0.5 cc. of 1:1,000 aqueous solution of epinephrine was followed by ventricular fibrillation. Normal cardiac rhythm was restored by use of an electrical defibrillator in each case, and both patients survived without signs of injury to the brain. This is in accord with other published data indicating that these methods of resuscitation, if applied without delay, greatly improve the prognosis of patients with acute myocardial infarction.

The unusual occurrence of two successful cases of cardiac resuscitation outside the operating room in acute myocardial infarction within a three-week period at this hospital gave impetus to the present study of cardiac massage. The results of this investigation indicate that cardiac massage can alter the dire prognosis of patients with ventricular fibrillation or cardiac arrest complicating acute myocardial infarction.

With the number of recently reported cases of successful myocardial resuscitation in the last several years, cardiac massage has been thought of as a modern innovation. However, a review of the available literature indicates that the earliest attempt at cardiac massage occurred in 1874[1] and the first successful resuscitation in 1902.[2] After this, there were other sporadic case reports of successful cardiac massage and defibrillation carried out in the operating room where surgeon, anesthetist, and equipment were immediately available. It was not

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From the Division of Adult Cardiology, Department of Medicine, Henry Ford Hospital.

until 1953 [9] that successful cardiac massage outside the operating suite was reported in the available literature. The present paper adds two more successful cases of cardiac resuscitation in acute myocardial infarction performed outside the operating room.

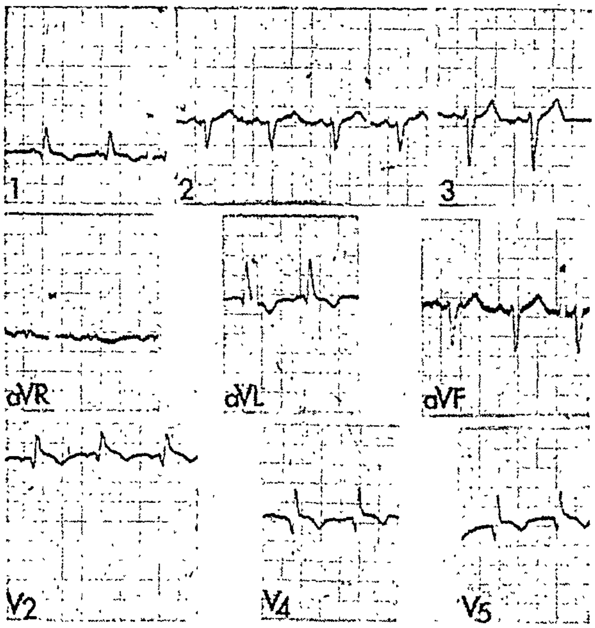

Fig. 1 (case 1).—Electrocardiogram taken two hours after cardiac massage, showing findings consistent with acute anterior myocardial infarction.

Report of Cases

Case 1.—A 53-year-old man was initially seen on Aug. 24, 1958, at the Henry Ford Hospital in the emergency room, where he registered with the chief complaint of left arm pain of several hours' duration. While removing his clothing in one of the examining booths, he collapsed to the floor. Both a surgical and a medical doctor in adjoining booths were able to reach him immediately. He lay on the floor in a tonic convulsion with contraction of masseter and extensor body muscles and with progressively increasing facial cyanosis. Rapid evaluation revealed the patient to be essentially dead without heartbeat, respiration, or reflexes. An airway was inserted, and intermittent positive-pressure breathing was initiated approximately one to two minutes after collapse. After the precordial area was pounded several times without results, an incision was made in the left fifth interspace. There was no bleeding from the skin and subcutaneous tissues, and the incision was extended into the thoracic cage. As rib retractors were applied, the lungs were seen to be expanding well. Cardiac massage, with use of the posterior approach and upward-palm-pressure technique, was begun by Dr. Emir A. Zikria and continued in teamwise fashion two to three minutes after collapse of the patient.

Initially no cardiac contraction was felt or seen through the pericardium, but after intracardiac injection of 0.5 cc. of a 1:1,000 aqueous solution of epinephrine, ventricular fibrillation occurred. The defibrillator was prepared, and 0.8 mg. of lanatoside C (Cedilanid) was injected into the heart for the purpose of strengthening the heart once fibrillation was stopped. Thirty minutes after initiation of cardiac massage, an alternating current was passed across the heart and apparent normal cardiac rhythm established. Bleeding became more active from the operative site, and the patient became very restless. He was taken to the operating room and his thoracotomy wound repaired. At this time, a small area of myocardial discoloration was noted on the anterior surface of the heart.

An electrocardiogram (fig. 1) taken in the recovery room immediately after surgical repair showed a normal sinus rhythm and changes compatible with an anterior myocardial infarction. A subsequent electrocardiogram (fig. 2) confirmed these findings. The patient was awake and alert eight hours after cardiac massage, with no evidence of brain damage. He told of having exertional left arm pain for four years; however, events of the day prior to his collapse were not recalled. Methoxamine (Vasoxyl) hydrochloride and levarterenol (Levophed) were needed for 48 hours to maintain the patient's blood pressure. There was no sign of oliguria, and his urinary output was excellent.

Laboratory studies the day of admission revealed a normal hemoglobin level. The white blood cell count was 19,000 per cubic millimeter. Urinalysis showed a specific gravity of

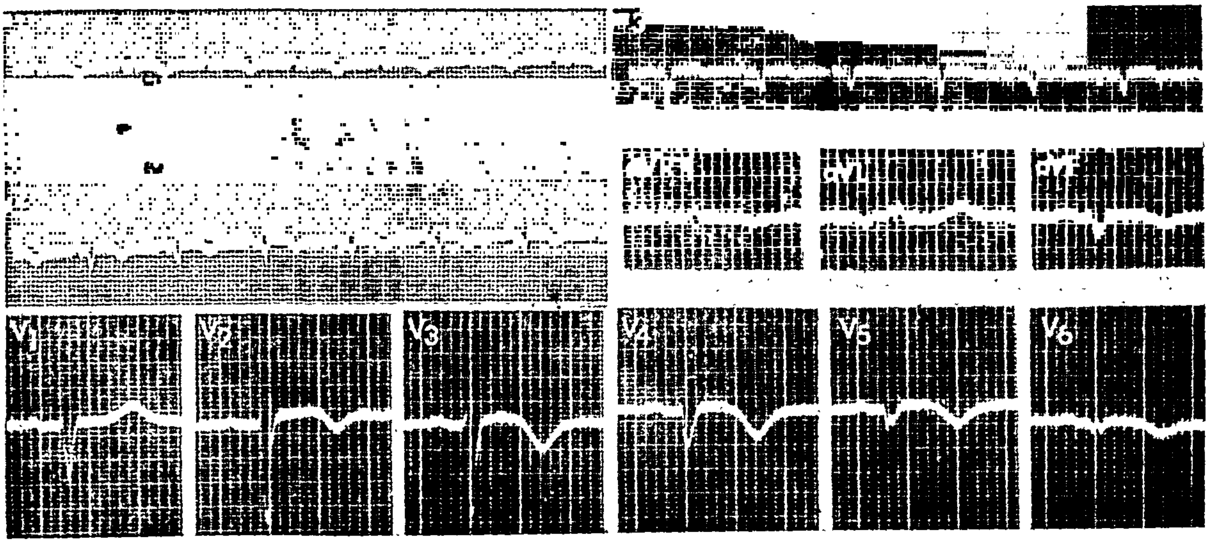

Fig. 2 (case 1).—Electrocardiogram taken four days after cardiac massage, confirming diagnosis of acute anterior myocardial infarction.

1.020, acid, albumin 4+, Benedict's test result negative, granular casts, many red blood cells, and 6 to 8 white blood cells. The urine cleared in seven days. The serum transaminase level was 150 units two days after admission; it decreased to 31 in 5 days and to 16 in 10 days. Initially chest x-rays were clear, but within four to five days a small collection of fluid was noted at the left base. The patient recovered uneventfully and is, at the time of writing (six months after admission), asymptomatic.

Case 2.—A 40-year-old man was first seen in the outpatient clinic on Sept. 19, 1958, with the chief complaint of transient, burning retrosternal pain of four days' duration. The pain was present only with activity and radiated to the left shoulder and down the inner aspect of the left arm. A physical examination gave normal findings. The blood pressure was 140/90 mm. Hg and the pulse rate 72 per minute and regular. The initial impression was coronary artery insufficiency with impending myocardial infarction, and the patient was admitted to the inpatient service. The transaminase level determined at this time was 12 units, and an electrocardiogram showed, as the only abnormality, a slight ST-segment depression in leads V_2 through V_4. While the medical floor resident was making rounds the next morning, the patient's respirations suddenly ceased. He appeared cyanotic and lifeless, and no heartbeat was audible. Approximately three minutes after his collapse, a thoracotomy was performed by Dr. M. A. Block. Cardiac massage and mouth-to-mouth breathing was started, and an intravenous cut-down was placed in the patient's right leg. After about 0.5 cc. of a 1:1,000 aqueous solution of epinephrine was injected into the heart, weak ventricular fibrillation started. The patient was taken to the operating suite for defibrillation with the defibrillator and surgical repair 45 minutes after arrest. Levarterenol was used for 72 hours to maintain the patient's blood pressure. Urinary output was good. There was no suggestion of cerebral damage, and the patient talked rationally about eight hours later.

Laboratory studies obtained just after the cardiac arrest revealed a white blood cell count of 14,000 per cubic millimeter, hemoglobin level 12.6 Gm.%, and nonprotein nitrogen level 30 mg.%. Urinalysis revealed a specific gravity of 1.014, neutral, albumin 1+, Benedict's test result negative, few hyaline casts, 25 red blood cells, and 50 white blood cells. The transaminase level remained at 100 units for three days and then decreased to 60 units on the fourth day. Chest x-rays revealed a minimal amount of fluid in the left lung base. The patient was asymptomatic five months after his cardiac standstill. Electrocardiographic findings (figs. 3 and 4) had been consistent with an acute anteroseptal myocardial infarction.

The medical records of five cases of cardiac arrest in acute myocardial infarction with cardiac massage at this hospital were reviewed (see table).

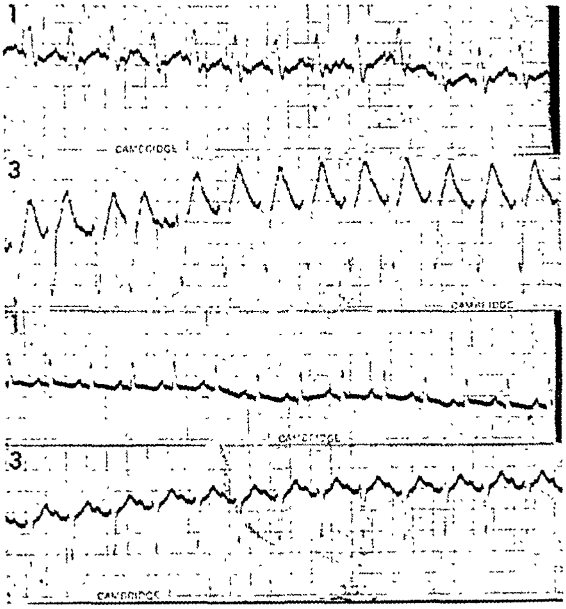

Fig. 3 (case 2).—Electrocardiogram taken *(top)* two and *(bottom)* five hours after cardiac massage.

In all of these cases, massage of the heart was performed either in the emergency room or in the patient's hospital room. Of these five patients, three presented the clinical picture of an impending myocardial infarction. Laboratory studies prior to cardiac arrest were available in two. Electrocardiograms showed ischemic changes, while the white blood cell count, sedimentation rate, and trans-

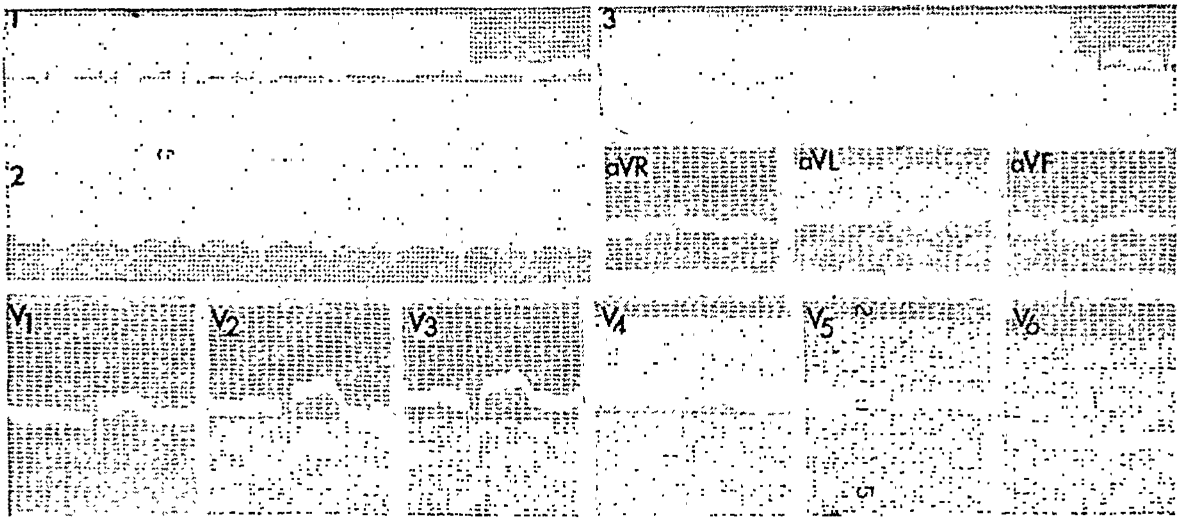

Fig. 4 (case 2).—Electrocardiogram taken three days after cardiac massage, showing findings consistent with acute anteroseptal myocardial infarction.

aminase level were normal. The fourth patient was treated for a pulmonary infarction and initially thought to have a normal cardiac status. The fifth patient was an elderly diabetic with severe chronic congestive heart failure, shown to have an old myocardial infarction at autopsy. At the time of cardiac arrest, a rapid examination was carried out on each patient. The examining physician noted a cadaveric appearance to the body in each case and was not able to detect any respirations, heartbeat, or reflex response. Cardiac resuscitation was carried out successfully in four of the five patients. However, two died shortly after massage. The cause of death in one of these patients was probably brain damage secondary to poor initial pulmonary ventilation. The other patient died from widespread embolic occlusion 10 minutes after massage. The unsuccessful case of cardiac resuscitation was in an elderly man with diabetes mellitus and severe congestive heart failure. Two patients, whose cases are reported above in detail, are alive and well at the time of writing and show no evidence of brain damage.

Results of Cardiac Massage in Five Men with Acute Myocardial Infarction

	Case No.				
	1	2	3	4	5
Age, Yr.	53	40	38	50	60
History					
Previous myocardial infarction	None	None	None	None	Anteroseptal myocardial infarction
Previous heart disease	Slight transient angina, 4 yr.	None	None	None	"Arteriosclerotic heart disease," heart failure
Chief complaint	Episodic pain in left arm, 12 hr.	Impending infarction, 4 days	None	Impending infarction, 12 hr.	None
Location at arrest	Emergency room	Inpatient	Inpatient	Emergency room	Inpatient
Treatment after arrest					
Pulmonary ventilation	IPPB*	Mouth-to-mouth	Nasally given oxygen, artificial respiration	Nasally given oxygen, artificial respiration, IPPB* 20 min.	Mouth-to-mouth artificial respiration, not continuous
Duration of massage, min.	30	45	5 to start, 45 2nd time	20	20
Intracardiac drug therapy	0.5 cc. of 1:1,000 epinephrine, lanatoside C	0.5 cc. of 1:1,000 epinephrine	None	Epinephrine, nikethamine	Calcium chloride, isoproterenol
Defibrillator	Converted	Converted	Not used	Converted	Not used
Levarterenol	48 hr.	72 hr.	Not used	9 hr.	Not used
Chest pounding	No help	No help	No help	No help	No help
Results	Alive and well	Alive and well	Lived 10 min.	Lived 9 hr.	Died immediately
Electrocardiograms					
Before massage	None ↓	S-T segment depression V_2-V_4 "ischemia" 12 hr. ↓	Normal 1 wk. ↓	S-T segment depression V_2-V_6 normal transient "ischemia" 3 hr. ↓	Old anteroseptal infarction 2 days ↓
After massage	Acute anterior myocardial infarction	Acute anteroseptal myocardial infarction	...	Acute myocardial infarction	...
Consciousness regained and lucid, time	8 hr.	8 hr.	Never	Never	Never
Factor in failure	...	...	Overwhelming emboli	Poor pulmonary aid	Poor health of patient
Autopsy results	...	...	Multiple emboli to brain, lung, and *right coronary* artery	Fresh thrombosis in left circumflex coronary artery	Old anteroseptal infarction, fresh thrombus with posterolateral infarction

* IPPB = Intermittent positive-pressure breathing.

Adequate pulmonary ventilation was as important in the success of resuscitation as the actual cardiac massage and defibrillation. Intermittent positive-pressure breathing and the mouth-to-mouth method were both satisfactory to keep the patient breathing and his blood oxygenated. In contrast, artificial respiration and nasally given oxygen did not provide enough air pressure to fill the lungs completely. Intracardiac administration of epinephrine was used in three cases, and ventricular fibrillation resulted. One patient also received intracardiac treatment with lanatoside C. Whether these drugs were beneficial or not is difficult to say. Levarterenol appeared necessary to maintain blood pressure in the patients who were rescued.

Autopsy material confirmed the clinical evidence of acute myocardial infarction in the three patients who died. A fresh thrombus was found in the left circumflex coronary artery of one, while thrombophlebitis with multiple fresh emboli to brain, lung, and right coronary artery was noted in another. The patient who died almost immediately after cardiac massage had, at autopsy, a fresh thrombus in the anterior descending branch of the left coronary artery and an old anteroseptal myocardial infarction.

Comment

Several theories have been advanced to explain the cause of sudden death in apparently normal persons and those with coronary artery disease. Many depend almost entirely on some type of neurogenic mechanism. White[4] suggested that excess reflex stimulation of the vagus nerve, with paralysis of the pacemakers or ventricular fibrillation, could cause sudden death. Beck and coworkers[5] postulated that death from coronary artery disease occurred in either one of two ways: The majority (90%) were due to electrical instability; the remainder (10%) were due to actual cardiac muscle failure. Oxygen differentials in contiguous areas of heart muscle, such as is produced by coronary artery insufficiency or myocardial infarction, produces electrical currents which are responsible for the arrhythmias that kill. It has been estimated that electrical instability without initial muscle damage kills one-third of all victims with acute myocardial infarction. In the other two-thirds, myocardial damage is present but not significant enough to prevent the heart from responding to cardiac massage. Since it has been estimated that sudden death due to cardiac disease occurs 10,000 times each year in the United States alone, the potential of cardiac resuscitation in patients with coronary artery disease who die because of arrhythmia is great. Four patients presented in the present series (see table) responded to cardiac massage with a normal cardiac rhythm. This would support Beck's theory that most cases of cardiac arrest are due to electrical instability and not secondary to irreparable myocardial damage. The one patient whose heart did not respond in any way to cardiac massage was in extremely poor physical condition.

Bloomfield and Mannick[6] feel that it is necessary to document the myocardial infarction prior to arrest to discern the necessity of thoracotomy. They also suggest that the electrocardiographic changes of myocardial infarction noted only after the cardiac massage in most cases reflect manipulative trauma rather than true myocardial infarction associated with coronary artery disease. In this study, all patients presented without evidence of acute myocardial infarction until cardiac arrest occurred. The acute myocardial infarction itself appeared to be the immediate, initiating event for cardiac arrest. To investigate the possibility that the electrocardiographic changes were on the basis of cardiac massage, the medical records of six living patients who developed cardiac arrest in the operating room, as a complication of operations, were reviewed. No heart disease was evident in any of these patients, and preoperative electrocardiograms were normal. After cardiac massage, no change or abnormality could be detected in repeated electrocardiograms. Cardiac manipulation or massage per se, therefore, would appear not to produce electrocardiographic changes of acute myocardial infarction. The acute myocardial infarction pattern that occurred in the two patients in whom cardiac resuscitation was successful was on the basis of true coronary artery disease. In fact, a damaged area was seen in the first patient during massage.

In the heart with ventricular fibrillation, cardiac massage is necessary as a preliminary measure to improve myocardial oxygenation and tone prior to attempts at electrical defibrillation, and also to prevent a recurrence of the fibrillation. Wiggers[7] demonstrated in dogs that ventricular fibrillation regularly occurred after ligation of a coronary artery. Defibrillation with electric shock was always possible, but fibrillation recurred unless the tie occluding the coronary vessel was removed and myocardial oxygenation improved. Four minutes has been set as the time limit within which adequate circulation must be artificially established.[8] In dogs, complete arrest of cerebral circulation for greater than three minutes and 25 seconds produces irreversible neurological changes.[9] In a review of cases collected from the entire United States, there was a much higher survival rate when the massage was started within four minutes, as contrasted to when it was started after this.

From observation of the two recent cases of successful cardiac resuscitation in acute myocardial infarction and from the analysis of three other cases with massage, an altered prognosis is at hand for many patients who would otherwise die from acute myocardial infarction. If a patient with good myocardial reserve develops myocardial infarction with arrest or ventricular fibrillation, cardiac massage may be a life-saving measure. Immediate restoration of effective circulation, as well as adequate ventilation, is vital.

Summary

In two patients with cardiac arrest in acute myocardial infarction, successful cardiac resuscitation occurred outside the operating room. There is, with cardiac massage, a favorable prognosis in cases of cardiac arrest or ventricular fibrillation in acute myocardial infarction.

2799 W. Grand Blvd. (2) (Dr. Nickel).

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SOME NONTECHNICAL ASPECTS OF OPEN-HEART SURGERY IN THE COMMUNITY HOSPITAL

Alfred R. Henderson, M.D., Robert R. Meijer, Ph.D., Harvey Black
and
Georges Oteifa, M.D., Asbury Park, N. J.

Considering present world-wide birth rates and figures relative to the incidence of congenital heart disease, fewer children are given the opportunity for corrective surgery within a year with present facilities than are born eligible within a given day. This fact does not take into consideration surgical candidates with acquired heart disease. Open heart operations are feasible within hospitals at the community level. The equipment needed is not as complicated as so often anticipated, and the chances for success are good if the proper personnel equip themselves with certain unpurchasable principles and if confusing, complicating, and obstructing attitudes and gadgets are kept out of the operating room. Particular emphasis is placed on thorough indoctrination of the entire team in the laboratory. The necessary personnel can usually be found, and the equipment acquired, by smaller communities as well as by larger ones, leaving only certain intangible personal traits to decide success or failure.

Four years of endeavor in the experimental laboratory and operating rooms in community hospitals has afforded ample opportunity to face challenging issues which should be of interest to others embarking on a similar course. Eliminating the purely scientific and technical problems encountered in undertaking open-heart surgery with use of a pump oxygenator, the thesis can be broadened to encompass almost any major, unique, and "drastically new" scientific project at the same civic level of medical and surgical practice. These problems should be of special interest to all young men who wish to go beyond the fringe of established and readily acceptable medical practice.

The subject may be divided into the following headings: (1) the practicability of open-heart surgery in the community hospital; (2) the availability of case material; (3) assembling a team; (4) preliminary experimental experience; (5) preoperative evaluation and selection of patients; and (6) some perplexities encountered at the beginning.

Practicability of Open-Heart Surgery in the Community Hospital

Cardiac surgery with a bypass pump oxygenator has become an established procedure in an ever-increasing number of institutions. To be sure, numerous problems pertaining to details, especially regarding oxygenating mechanisms, remain, but these are rapidly diminishing. Ambition for use of the new operation has become almost irrepressibly contagious among thoracic surgeons throughout the United States, and the problems involved are diminishing through its constant success.

In some institutions, the mechanical heart is in daily use and hundreds of patients owe their survival to it. A survey of the waiting lists of patients referred to some of the more well-known centers indicates increasing acceptance by medical men throughout the world. An impressive listing of cardiovascular anomalies considered applicable to bypass extracorporeal techniques is as follows: Congenital anomalies include ventricular septal defects, single ventricle, atrial septal defects, atrioventricular canal, tricuspid atresia, downward displacement of the tricuspid valve (Ebstein's disease), anomalous pulmonary venous drainage, pulmonic valvular and infundibular stenosis, tetralogy of Fallot, transposition of the great vessels, aortic sinus aneurysm, anomalous coronary arteries, aorticopulmonary window (aortic septal defect), subaortic stenosis, aortic regurgitation, and endocardial fibroelastosis. Acquired anomalies include aortic stenosis, aortic regurgitation, mitral stenosis and regurgitation, rupture of the sinus of Valsalva, intracardiac tumors, thoracic aortic aneurysms, and rupture of the ventricular septum.

Those with the greatest experience have shown that the mortality resulting from the operative intervention in certain congenital anomalies of the heart (e. g., interventricular septal defect), uncomplicated by some additional defects, such as severe pulmonary hypertension, and the effects of time-consuming indecision and unwarranted procrastination, can fall well within the justifiable limits of 2 to 3%. Other lesions of a more complicated and hazardous nature have mortalities well below those for the medical treatments assigned them. A continued downward trend attends operative experience. Indeed, the big "if" has been replaced by the big "when" in the protocols of numerous medical centers in the United States.

From the surgical services of the Fitkin Memorial Hospital, Monmouth Medical Center, Riverview Hospital, and St. Barnabas Hospital.

Still, as could easily have been predicted, far too many physicians have been little impressed or influenced by this giant step of surgical advancement. One of the important purposes of this paper is to reduce some of the unnecessary fears associated with the undertaking of this work, while arguing that open-heart surgery is entirely within the realm of a great many small city and community hospitals. It will be repeatedly pointed out that the possession of certain unpurchasable and intangible qualities will better determine its achievement than the physical plant and imposing props so often used as excuses for performance in some communities.

Availability of Case Material

The availability of patients will be determined by two factors: (1) the local incidence of recognized operable heart disease and (2) the cooperative efforts of regional colleagues in referring cases.

Incidence of Operable Heart Disease.—A completely acceptable estimate of the incidence of congenital heart disease in the general population is not yet available.[1] Most reports seem to be much too low. In view of the uncertainty of diagnosis and the widespread unfamiliarity with anomalous heart conditions, this is not surprising. Incidence reports from large series of births, postmortem examinations, and routine hospital admissions vary greatly (from 0.5 per 1,000 to 1.25 per 100). Figures based on routine examination of school children are also fallacious, since the highest incidence of death from congenital heart disease in any given year occurs during the first year of life.

Congenital and acquired heart disease occur with about equal frequency in the pediatric age group.[2] British authors report an over-all incidence of congenital defects of the heart of about 3 per 1,000 births and 1 per 1,000 at 10 years of age. Richards and associates,[3] reporting on 60,000 babies in New York City, place the figure at about 0.83%, including stillbirths. Lillehei and co-workers [4] state that about 50,000 infants born in the United States each year possess some form of anomalous heart. Considering present world-wide birth rates, this means that 2,000 infants with congenital heart disease are born every 24 hours.

Even more significant than mere figures is the fact that most of these infants possess correctable defects when techniques of open-heart surgery can be applied. Lillehei and co-workers [4] emphasize the all-important fact that, actually, less children are being given correction in a year, with present facilities, than are born eligible for operation within a given day. Though the figures are much less accurate than those for congenital lesions, a conservative estimate places at least 25,000 persons eligible annually in the United States for operation for acquired cardiac diseases.[4] This is all the more reason to reemphasize the need, the country over, for less complacency and apathy and more purposeful activity.

Keith and associates [5] report that congenital heart disease is the most common form of heart disease in infancy and childhood, rheumatic heart disease running second. Even a most superficial glance at any group of figures indicates the potential in terms of availability of clinical material. Indeed, the majority of patients arriving at the large medical centers have been sent from communities with inadequate facilities, some of them great distances away.

No colossal amount of graduate training will be required of the man in practice to recognize and properly channel patients suitable for more refined examination and possible operation. In the words of Osler: "The environment of a large city is not essential to the growth of a good clinical physician. Even in small towns a man can, if he has it in him, become well versed in methods of work, and with the assistance of an occasional visit to some medical centre he can become an expert diagnostician and reach a position of dignity and worth in the community in which he lives."[6] To know just what should be done is the first step; then to do it or get it done comprises the total philosophy of practical life. Convincing the practitioner, internist, and pediatrician in the community that local diagnostic and surgical facilities might be as good as those of the large city medical center is no painless and artless feat. We often speak of the need for laboratory space and materials, of aid and grants from this and that agency, but we so seldom openly speak of our most urgent needs: a genuine interest on the part of others within the medical precinct, unsolicited encouragement and reencouragement in the face of success and failure, purposeful and constructive discussion, and the offer of assistance and patient, understanding silence. The routine referral of available clinical material is a measure of final success; referrals during the trying days, when everything seems more potential than actual, are a measure of the faith and good will that make success inevitable. A man, or a team, in an unsettled environment cannot compose a peak performance.

Assembling a Team

One of the obstacles to be hurdled early in the course is the misguided notion that only by the assemblage of a vast throng of superscientists can this project be accomplished. Those who have not passed beyond proprietary literature and newspaper science are awed by the photographs depicting operating room scenes where, somewhere in the midst of the complex wilderness of gadgets and staff, is a patient undergoing open-heart surgery. The "pinball machine" effect would sometimes make a Rube Goldberg contrivance Arcadian by comparison. Nothing could be further from the truth.

To be sure, in some instances where a great deal of basic physiological data are to be obtained during the course of an operation, many recording and measuring devices will have to be used. This, however, must be differentiated from the mere monitoring of a patient through the procedure when additional or superfluous data are not absolutely necessary. Simplicity should be the governing rule in any area where the prime interest revolves around the performance of an operation per se rather than the gathering of coincidental scientific data. Every individual, each control, every recorder, and all connections and lines are potential sources of hazard to the patient. No effort should be allotted to unnecessary gadgets or experimentation. The prime interest of the team at the community hospital is the operative intervention on an anomalous heart with the swiftest and safest route between the diagnosis and the accomplished operation. Fundamentally, a team need consist of two or three surgeons, one scrub nurse and her personal assistant or circulating nurse, one monitoring cardiologist, one pump "engineer" and his assistant, a laboratory technologist, and the anesthetist and his assistant. Each member of the team must be thoroughly indoctrinated in his role by repeated performance in the experimental laboratory long before the final move into the operating room. Disciplinary repetition in the laboratory has made each individual procedure as perfect and mechanical as that of eating a meal.

No matter how "simple" such devices as mechanical hearts may become, or how readily patients and colleagues accept the new technology, it is a foregoing truth that many hours will have to be spent by the surgical team subjecting themselves to the nurturing experiences gained only through repeated experiments in the laboratory.[7] "There is no more potent antidote to the corroding influence of mammon than the presence in a community of a body of men devoted to science, living for investigation and caring nothing for the lust of the eyes and the pride of life."[8] Of such material must a team ideally be constituted.

As part of the team it may well be necessary to include persons who are otherwise employed as engineers, physicists, steamfitters, and even veterinarians—anyone who can and will contribute a needed talent to the fulfillment of the project. A community is composed of a heterogeneous group of people of varying backgrounds and training. Much valuable aid can come from those who are so often willing to contribute to any purposeful effort. Indeed, this is a distinguishing feature of the community hospital setup. Repeated and motivated experiment, attention to minute details, the capacity for work before 9 a. m. and after 4:30 p. m. and Saturdays and Sundays as well, capacity for continued learning, the ability to keep from becoming too easily satisfied, the desire for progressive improvement, and many more intangibles, unpurchasable or obtainable by diplomas and degrees, are the necessary ingredients for a successful team. No amount of building space, grants-in-aid, or fancy and friable glassware will make it work.

Much debate goes on concerning the good and less desirable features of the various mechanisms available—bubblator versus diffusator, finger pump versus roller pump, heating versus cooling, or rubber versus plastic. Amid the confusing clamor there rises one unmistakable fact: some group, or groups, has made every kind of pump and oxygenator work within the justifiable region of safety. You cannot argue with success, and though one way may be somehow better than another there is the undisposable truth that the team is the most important single factor in success. Unsuccessful experiences will least and last of all condemn the human part of the mechanism.

Preliminary Experimental Experience

Mechanical heart-lung machines, though now flagrantly advertised in medical journals as seemingly "ready to use," cannot be bought and assembled like "do-it-yourself kits" and be made to work. Once assembled, the product becomes unlike any other on earth, appearance notwithstanding. No quantity of available funds can buy such a machine ready for use. There is much to be learned concerning its performance under every variable condition of temperature, flow-rate variation, and flow-volume conditions, the amount of oxygen required under any condition of flow, the adaptability to varying patient size, and a multitude of other inconstant details of performance.

The answers to the many basic factors to be learned are not all found in articles or in the results of any other man, machine, or group. There is no effortless or painless way of working out the obstacles and wrinkles; there is no pleasant and palatable way for arriving at even the simplest of principles that need to be understood. Work is the magic word; it is the open sesame to achievement. Without work, without the willingness to repeat experiment after experiment until there remain no unanswered questions regarding safety within reason, a man has no right to transport his equipment from the experimental laboratory to the operating room.

This does not mean that an impressive number of experimental successes need be on hand for reporting, though some seem to relate success to large sums of figures. We know of one group who operated on 140 dogs before a survival was achieved and of another who became repeatedly successful after the fifth animal experiment. There is no doubt in our minds that one group paid more attention to details than the other. No one doing experimental work in the community hospital, where animals, money, time, and effort may exist at a greater premium, can afford unnecessary waste in any direction. The prime motives should be not to design some new freak, basically unlike anything else on earth, but to assemble an apparatus from units known to be useful and practicable and to get it to work so that the community can benefit positively from its presence. Alterations in design and expensive tool and die work should be left principally to the large centers where money, manpower, time, space, and available machine shops are accessories to routine performance.

To visit groups working elsewhere, to spend sufficient time with others who have pioneered and won success, will prove time-saving and effort-saving. It is also an inspiring experience to witness success. It is encouraging to watch another group successfully function together. It is a tonic beyond words to witness an aspiration of your own come true elsewhere—nothing else is more reassuring.

It is important to send all members of the team on such "tonic tours." Scrub nurses, private duty nurses, laboratory technicians—all have much to learn, and there is no learning that equals learning at first hand, which will prove an investment beyond decimal points and dollar signs. The day probably will never come when the perfect, tailor-made machine, devoid of human error in its mechanism and running, will be available. Those who sit idly by, waiting for this era, always find reasons for justifying idleness and poor performance. Progress has been the accomplishment of those who were ever fearful that they could not do enough and not of those who were afraid they were doing too much or more than their share.

Preoperative Evaluation and Selection of Patients

Again, illustrations and reports of monitoring appliances and recording apparatuses serve to confuse uninitiated minds. There is no intention to degrade, decry, or criticize the larger institutions that are doing an important job of gathering physiological data about disease. But a distinction must be made for the man in daily practice between the study of patients for purposes of attaining myriads of different academic data and the study of patients merely for making a working diagnosis. One actually needs to invest in only a few relatively simple pieces of apparatus to carry out the everyday needs for diagnosis and evaluation of patients for cardiac surgery. Aside from the routine studies (electrocardiograms, x-rays, and the usual laboratory tests), cardiac catheterization and, occasionally, angiocardiography are indispensable to the evaluation of the patient with congenital heart disease; such studies give sufficient data for a working diagnosis on which one can determine the need for surgery. Indicator dye dilution curves, phonocardiographic recordings, and electrokymography yield some additional data but may unnecessarily overburden the minds, pocketbooks, and available time of the part-time type of team which can be assembled in the community hospital.

After all, what precisely does the surgeon need to know other than a tenable diagnosis? Intracardiac and pulmonary vascular pressures and sometimes pulmonary arterial wedge pressure curves, pressure gradients across valve orifices, sites of shunts, and position of anomalous vessels are the basic preoperative requisites. With the dissemination of available, trained, thoracic surgeons, the stimulus is present for many small hospitals to incorporate these basic studies in their work-a-day protocol.

The most common error from the surgeon's point of view, associated with impatience to get started, is to select almost any kind of case for his initial efforts. Knowing that much is to be gained by a successful operation on a patient with an advanced cardiac problem, for whom there is no help from any other source, he is often willing to take the long chance—ignoring the fact that surgical failures have a more profound reverberation than medical failures. An early high mortality is much less tolerated at the community level, where criticism of new procedures is readily given. But the surgeon often finds himself in a whirlpool of confusion, being denied relatively "healthy" patients who can better tolerate the operative insult and being given the symptomatic cases which are the most impressive from the unreasonable clinician's viewpoint. A patient without symptoms is much more apt to be kept from the surgeon. In congenital heart disease it is much wiser to operate on existing pathology and not on the patient's symptoms.

Pulmonic stenosis (valvular and infundibular), interatrial septal defects, and pure interventricular septal defects without significant pulmonary hypertension constitute cases ideally suited for a beginning. Gradually, tetrology of Fallot, anomalous pulmonary venous drainage, acquired valvular heart disease, and others can be added as operative experience and acceptance are gained.

Some hospitals set up conferences comprised of members of the general staff to decide on the selection of cases. This is often fallacious from first thought, since such a group consists in the main of "voting members" who are ill-equipped, insufficiently interested, and unlearned in the field and who often gain very little from this real opportunity to learn. It is far better to set up a small group of genuinely interested men, internists, pediatricians, laboratory personnel, and the catheterization and surgical teams, to make these decisions. In this group there should be no room for the man who makes little or no earnest effort to acquaint himself with the fundamentals and who only visits the larger centers, availing himself of the voluminous written material and attending regional and national meetings. It has been stated that the clinical material can be found in the community, that the opportunity is always present, and that only work remains as a personal factor to be contended with.

Perplexities at the Beginning

Some intangible qualities of people have been stressed as the most important components of the various factors comprising the organization and functioning of a team. Lest one would be impressed wrongly that certain physical factors are of little consequence, a few words must be said concerning the importance of such tangibles as money and materials, space and time, and personal and personnel problems.

Most community hospital's and sources of funds for medical research are limited in comparison with the sizable grants and budgets of the larger centers. Being restricted, one cannot buy everything one would like to buy. This may not be such a handicap after all.

Much of our limited time and effort can be wasted on "gadgeteering." More than one great laboratory is arrayed with functionless expenditures, representing previous pursuits long since passed up for seemingly more worthwhile pursuits. The community hospital and the community can ill afford purposeless expense or the space to function as a museum.

One of the first principles, then, is to recognize the limitations of activities. A man who undertakes this project at the community level lives three distinct lives—one for the project, one for his practice, and one for his personal or family life. He becomes a part-time devotee to each. He is constantly faced with decisions as to which to devote himself to, since, when he decides on one, he automatically decides not to do another. His life becomes crowded with little or no time for refreshing unessentials; when lack of money or energy does not limit him lack of time does. He soon finds himself in the same dilemma as the youngster with a penny who wants one of each thing under the counter.

This is no doubt the most momentous task of all—to decide on the goal, strip it of unessentials, and then select the straightest and shortest route to its achievement, appearing unencumbered by a restricted budget, inadequate space, or disinterested and incredulous colleagues. The goal, of course, will be the creation of a relatively simple mechanism capable of maintaining extracorporeal circulation and oxygenation in the safest possible manner. There will be a limit to the sidetracking experiments and other pursuits which may only wind up with a self-satisfying bibliography.

Local and neighboring county and state divisions of the American Heart Association have proved most generous in granting financial aid to community hospitals undertaking such programs. Other organizations and clubs within the community are often likely sources of small annual donations, as well as hospital auxiliaries and interested individuals. The hospital and its administrators should consider the project an investment worthy of space and other resources. Indeed, without this interest there can be no beginning.

The difficulty is that the man or group needing the cash finds it an easy matter to think that others should be ready to part with it. It will take a lot of repeated efforts, speaking engagements, and other methods of public convincing that this, unlike other demands, is more than indiscriminating charity or giving. Every attempt must be made to make such drives for financial aid of an initiating and temporary nature, stressing the eventual creation of a self-sustaining and independent mechanism or one needing a minimal amount of aid for its sustenance. One of the best stimuli for convincing support is activity itself. A group already at work is more apt to receive help than one which spends time sharpening pencils, clearing desks, and waiting for an uninterrupted day, the mood, the money, or other desirables which seldom come without real effort.

Everything comes to him who hustles while he *waits. Hours pass, days go by, and so do the years* and even life itself finding men and institutions nursing intentions. One message, if nothing else, we wish to impart is this:

Given a trained surgeon and an interested and dedicated group of workers in a community hospital, there may be excuses but there are no real reasons why this newest surgical innovation cannot be added to the protocol. Postponement, the putting-off that usually waits for supposedly better times, circumstances, conditions, or machines, may cost the hospital an opportunity to take a giant scientific step forward. Patients, too, will be denied their rightful opportunity for this recent and effective treatment.

321 Sunset Ave. (Dr. Henderson).

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SURGICAL INTERVENTION IN HEMOPHILIA

REVIEW OF THE LITERATURE AND REPORT OF TWO CASES

George R. Pieper, M.D., Seymour Perry, M.D.
and
John Burroughs, M.D., Los Angeles

Two surgical operations on patients with hemophilia are described. One was an appendectomy performed on a 26-year-old man with the laboratory findings and long history of hemorrhages characteristic of hemophilia. The other was a goniotomy in a 7-month-old boy with similar laboratory findings and a history of recent hemorrhages. In both patients the antihemophilic globulin (AHG) concentration was less than 1% on assay. Infusions of fresh plasma were given before operation in both cases, and in the second case assays for AHG showed that adequate levels could be achieved by such infusions provided the apparatus was siliconized, the plasma chilled, and the infusion given rapidly. In the older patient the postoperative course was marked by some bleeding, but both patients recovered.

Hemophilia is a disorder of blood coagulation resulting from deficient plasma levels of specific factors, the most common of which is antihemophilic globulin (AHG), followed in incidence by plasma thromboplastin component (PTC) and plasma thromboplastin antecedent (PTA). Characteristically, the clotting time in hemophiliacs is prolonged, with a normal bleeding time, prothrombin time, and platelet count; thromboplastin generation and prothrombin consumption are abnormal. Brinkhous [1] has classified hemophilia as (1) severe (classic) hemophilia, with essentially no AHG by assay; (2) intermediate hemophilia, about 5% AHG; (3) mild hemophilia, about 15% AHG; and (4) subhemophilia, about 35% AHG. The latter type usually gives a normal coagulation time.[2]

Morbidity and mortality in the hemophiliac undergoing surgery are high; even extraction of a tooth may lead to serious bleeding problems. Craddock and co-workers,[3] for example, reported three deaths in five hemophiliacs after major operations. This report is an analysis of the experiences of various authors relating to the problem of major surgery in the individual with hemophilia. To our knowledge there has been no survey of the literature on this problem since Craddock's in 1948. In addition, we are reporting two patients with severe hemophilia subjected to relatively serious surgical procedures.

Report of Cases

Case 1.—A 26-year-old male student known to have classic hemophilia entered the University of California outpatient department in Los Angeles on July 15, 1958, complaining of recurrent dental abscesses. History included multiple recurrent hemarthroses and epistaxes beginning at age 8 months. Treatment had consisted largely of pressure to affected joints and immobilization. One blood transfusion when he was 2 years of age had caused a severe reaction and none had subsequently been attempted. Family history revealed no "bleeders" in five generations on the maternal side. However, clotting studies had not been performed.

Physical examination revealed an abscess of the lower right first molar tooth, with many other decayed teeth. There was little limitation of motion except in extension of the left knee. Pertinent laboratory findings were as follows: platelet count 117,000 per cubic millimeter (normal 200,000-350,000); coagulation time greater than 36 minutes; prothrombin time [4] was 10.5 seconds (100%); prothrombin consumption (Owren,[5] modified [6]) was zero; and thromboplastin generation (Miale and Wilson [7]) revealed deficiency of a plasma coagulation factor which corrected on substitution of normal BaSO$_4$-treated plasma. AHG concentration was less than 1% on assay.[8] X-rays revealed old arthropathy of both knees consistent with hemophilia.

The patient was scheduled for admission to the University of California Hospital, Los Angeles, for preparation for dental surgery. However, on the evening of Aug. 13, 1958, the patient entered the University of California Hospital emergency room complaining of anorexia, nausea, vomiting, and periumbilical pain of 30 hours' duration. Examination at this time revealed abdominal tenderness which gradually localized in the right lower quadrant, without guarding or rebound. The temperature was 39 C (102.2 F); rectal examination was unrevealing. The physical examination was otherwise as previously described. Urinary sediment contained 8-10 red blood cells per high-power field and 1-4 white blood cells per high-power field. The blood leukocyte count was 14,250 per cubic millimeter. Abdominal x-ray revealed a possible fecolith in the proximal appendix. A diagnosis of acute appendicitis with possible impending perforation was made, and, after considerable deliberation, operative intervention was elected. One unit (250 ml.) of fresh plasma was given intravenously over a period of 30 minutes, followed by a second unit which was allowed to drip during the operation. The clotting time was normal just prior to the operation, but, owing to lack of laboratory facilities at the late hour, AHG levels could not be obtained.

During surgery, which was performed by one of us (J. B.), all unnecessary trauma was avoided. The patient was given a general anesthetic without intubation. A right paramedian incision was made in the lower quadrant and bleeders tied with 0000 silk, with electrocoagulation of

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From the departments of medicine and surgery, School of Medicine, University of California Medical Center and Wadsworth Veterans Administration Center.

multiple small bleeding points. Serous fluid was encountered on entering the peritoneum. Immediately beneath the incision was a periappendiceal abscess enclosed in omentum, which was entered and suctioned. The omentum was dissected free proximal to the appendix with cautious clamping and ligation of the omental stump with 000 silk. The omentum was thus freed from the appendix and removed. The appendix was then carefully dissected free from surrounding tissues and removed in the usual manner. Three minutes' observation revealed no bleeding. The rectus sheath was closed around a 0.25 in. Penrose drain. Subcutaneous tissue was closed with interrupted 0000 silk around a drain, a light gauze dressing applied, and the patient returned to the ward in good condition. Blood loss was estimated at 50 ml. Pathological examination of the specimen confirmed the diagnosis of acute suppurative appendicitis with focal acute peritonitis.

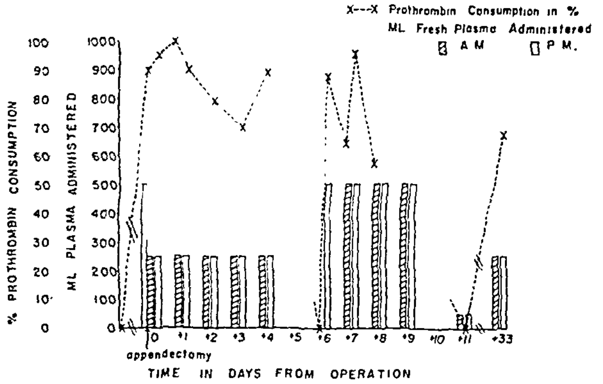

Fig. 1 (case 1).—Prothrombin consumption and plasma therapy in hemophiliac on whom appendectomy was performed.

Infusions of plasma were continued postoperatively. Treatment and results of prothrombin consumption tests are summarized in figure 1. On the ninth postoperative day the patient complained of dyspnea. Venous distention, pulmonary rales, and hepatomegaly were noted. A chest x-ray revealed multiple patches of density in both lung fields. These findings were attributed to hypervolemia secondary to plasma administration. The patient improved rapidly with sodium restriction and interruption in plasma therapy for two days. On the 21st postoperative day slow oozing from the wound site was noted and a subcutaneous hematoma appeared. Several small bleeding points in the drain site were cauterized with silver nitrate and the hematoma was allowed to absorb. Hematocrit levels remained constant throughout. On the 31st postoperative day a draining peridontal abscess in the right mandible appeared and responded promptly to antibiotics. The patient was discharged in good condition on the 39th postoperative day. Dental extractions were postponed at the patient's request.

Case 2.—*A 7-month-old male was admitted to the University of California Medical Center, Los Angeles, pediatrics department, for goniotomy procedure on Sept. 28, 1958.* Previous admissions had revealed multiple anomalies, including congenital adrenal aplasia, glaucoma, and hemophilia. Hydrocephalus was also suspected.

The infant had had a hemorrhage from a femoral venipuncture site previously, and hematochezia had been noted. The family history revealed no other "bleeders." It was not feasible to do clotting studies on other members of the family. Positive findings included a head circumference of 44.5 cm.; ocular tension, with the patient under anesthesia, was 40.6 by Schiøtz's tonometer (normal—less than 25).

Blood studies revealed a plasma factor deficiency in the thromboplastin generation test corrected by $BaSO_4$-treated plasma, and AHG of less than 1% on assay. Serum electrolytes, initially markedly abnormal, were corrected when treatment for the endocrinopathy was instituted. AHG levels are summarized in figure 2.

After preoperative preparation with fresh plasma infusions, the child was intubated and general anesthesia used. Surgery was performed by Dr. Stephen Seiff. Examination showed the corneal diameters to be 13 mm. on each eye, with tension of 5 with a 10 weight bilateral (equal to 40.6 Schiøtz). There were no gross breaks in Descemet's membrane. Bridle sutures were then passed beneath the inferior, superior, and medial rectus with scant bleeding. Goniotomy was attempted in the right eye but the anterior chamber collapsed and the procedure had to be terminated. However, goniotomy was successful in the left eye. Oozing was minimal.

The infant made an uneventful recovery from the goniotomy with relief of increased intraocular pressure. Fresh plasma infusions were continued postoperatively. Management of the hemophilia is summarized in figure 2. Surprisingly low levels of AHG in the infant's blood even after infusions of plasma led to the discovery of unfortunate errors in preparation of the plasma, as will be discussed later. Adequate levels were achieved, however, in both the plasma for infusion and the patient's blood, when siliconized apparatus was used for collection, when the plasma was constantly chilled, and when administration was rapid.

Comment

Surgery in the hemophiliac has always carried with it a prognosis so serious that surgeons have avoided any operative procedures if possible. The table summarizes all case reports in the available literature of major surgery in hemophiliacs. Cases were included when they met the criteria outlined by Craddock,[3] namely, (1) laboratory findings of prolonged clotting time without abnormalities in other tests of the hemostatic mechanism, (2) positive family history, (3) history typical of hemophilia, and (4) occurrence in a male. In addition, most recent reports include assays for specific defects. It should be noted that all of the criteria do not apply to every case. In both of our cases, for example, family history was negative. Absence of a history of bleeding likewise does not preclude the diagnosis of hemophilia. However, previous episodes of hemarthrosis, bruising, hematuria, and

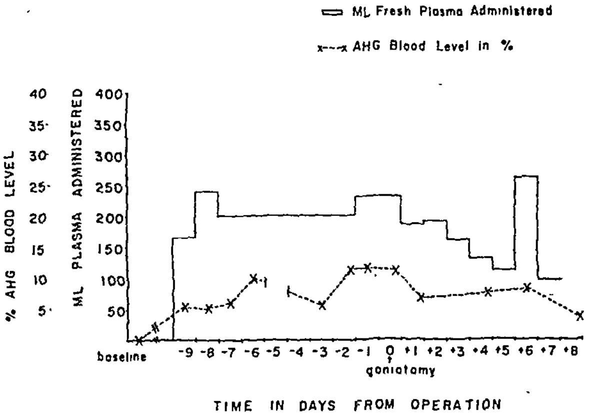

Fig. 2 (case 2).—AHG blood level and plasma therapy in hemophiliac on whom goniotomy was performed.

continued oozing from minor lacerations are found in most severe hemophiliacs and lend support to the diagnosis. Occurrence in the female is extremely rare.[9]

Of the 50 cases listed in the table, mortality from major surgery was 20%; the same mortality applies when only the 24 cases with laboratory-proved coagulation defects are selected. Intra-abdominal operations in 22 proved hemophiliacs of all types resulted in 3 deaths, a mortality of 13.7%. Among 12 hemophiliacs, appendectomy led to three deaths; 2 proved hemophiliacs of 7 undergoing surgery died, a mortality of 28.6%.

*Major Surgery in Hemophilia—Reported Cases**

Authors	Date	Operation	AHG Deficiency Proved	Outcome	Remarks
This report	1958	Goniotomy	Yes	Recovery	
This report	1958	Appendectomy	Yes	Recovery	
Lisker et al.	1957	Appendectomy	No	Recovery	PTA deficiency
Gross et al.	1957	Splenectomy	Yes	Death	
Gross et al.	1957	Splenectomy	Yes	Recovery	
Gross et al.	1957	Splenectomy	Yes	Recovery	
Gross et al.	1957	Splenectomy	Yes	Recovery	
Kekwick and Wolf	1957	Radical abscess drainage	Yes	Recovery	
MacFarlane et al. [12]	1957	Laminectomy	Yes	Recovery	
MacFarlane et al. [12]	1957	Excision, hematoma	Yes	Death	Became anuric
MacFarlane et al. [12]	1957	Leg amputation	Yes	Death	Infection
MacFarlane et al. [12]	1957	Evacuation of clot	Yes	Recovery	
MacFarlane et al. [12]	1957	Mastoidectomy	Yes	Recovery	
Parks and Wass	1956	Resection of ileum	Yes	Recovery	
Jones and Knighton	1956	Laminectomy	Prob	Survived	Lab data not provided
Jones and Knighton	1956	Trephine, aspiration	Prob	Death	Lab data not provided
Jones and Knighton	1956	Packing, subdural space	Prob	Death	Lab data not provided
Remigy et al.	1956	Appendectomy	Yes	Recovery	
Meynell and Tudor	1956	Resection of ileum	Yes	Recovery	
Crevald	1956	Gastric resection	Yes	Recovery	
Crevald	1956	Trephine, evacuation	No	Recovery	PTC deficiency
Desmond	1955	Gastric resection	Yes	Recovery	
Eldin	1955	Gastric resection	Yes	Recovery	
Walker	1955	Partial gastrectomy	Yes	Recovery	
Lund	1950	Splenectomy	Prob†	Recovery	
Landry and Shoukimas [13]	1950	Appendectomy	Prob†	Recovery	
Craddock et al. [3]	1948	Appendectomy	Prob†	Death	
Vermooten	1948	Prostatectomy	Prob†	Recovery	Transurethral route
Vermooten	1948	Nephrectomy	Prob†	Recovery	
Wright	1948	Splenectomy	Prob†	Recovery	
Wright	1948	Resection, mandible	Prob†	Recovery	
Greene and Heck	1947	Prostatectomy	Prob†	Recovery	Transurethral route
Karitzky	1943	Débridement	Prob†	Recovery	
Vance	1939	Appendectomy	Prob†	Death	
Mertz and Meiks	1938	Nephrectomy	Prob†	Death	
Birch [14]	1937	Appendectomy	Prob†	Death	Pneumonia
Friedrich	1935	Splenectomy	Prob†	Recovery	
Friedrich	1935	Gastric resection	Prob†	Recovery	
Cloran	1935	Appendectomy	Prob†	Recovery	
Hays	1934	Tonsillectomy	Prob†	Recovery	
Henman	1933	Prostatectomy	Prob†	Recovery	
Blalock	1932	Amputation	Prob†	Recovery	Local hemostasis possible
Prima	1931	Appendectomy	No	Recovery	
Emile-Weil	1931	Appendectomy	Prob†	Recovery	Sex not reported
Emile-Weil	1931	Incision, Drainage	Prob†	Recovery	Local hemostasis possible
Emile-Weil	1931	Gastroenterostomy	Prob†	Recovery	
Wasnessensky	1930	Gastric resection	Prob†	Death	
Mathe and Mitchell	1929	Polypectomy, fulguration	Prob†	Recovery	
Hipsley	1923	Appendectomy	No	Recovery	
Pag	1913	Appendectomy	No	Recovery	

* Additional references to reports cited will be furnished by the authors on request.

† These cases in 1950 and earlier fulfill criteria outlined in text. However, since the thromboplastin generation test and AHG assay were not being done at the time, they can be listed only as "probables."

These mortality figures for hemophiliacs undergoing major surgery are approximately half those reported by Craddock,[3] and are also considerably lower than those of Friedrich in 1935.[10]

For appendectomy, the mortality figures are also approximately one-half of Craddock's figure of 66.6%.[3] The incidence of death in normal persons after appendicitis with rupture and peritonitis, who are treated conservatively and without operation, is 10 to 15%.[11] While hemophiliacs are known to suffer serious complications during conservative management, especially with infections,[12] nevertheless it appears that appendectomy in the hemophiliac is attended by twice the mortality of conservative treatment. Morbidity is also higher in the hemophiliac in whom operation was done. In terms of length of hospitalization, hemophiliacs remain in the hospital an average of 34 days after appendectomy.[13] Normal persons with appendicitis but without rupture have a six-day hospitalization after appendectomy.[11a] Conservatively managed normal persons with appendicitis and abscess formation stay in the hospital only 20.6 days.[11a] Data on the conservative management of appendicitis in hemophiliacs are inadequate. In addition, many of the hemophiliacs studied had life-endangering hemorrhages during the prolonged postoperative course.

Management of hemophiliacs in recent years appears to be improving, an impression substantiated by the report of only 1 death in 17 recent intraabdominal operations. There appears to be an increasing willingness to perform operations on hemophiliacs. Thus, of 45 cases in the literature, half were reported in the last decade.

Major surgical procedures in sites where local hemostatic measures are applicable present much less of a problem than internal operations.[14] For this reason, surgery involving extremities will not be discussed here. The use of local cooling measures to enhance vasoconstriction, and hemostatic substances such as fibrin foam placed into the wound, all help to induce coagulation. However, with bleeding into hollow viscera or into cavities, these measures are not applicable and the possibility of exsanguination is increased.

In case 1 several favorable factors applied: the patient's coagulation defect was known, permitting swift correction; fresh plasma was immediately available; and the appendix was easily mobilized through a bloodless incision. In spite of this good fortune, the patient developed a large hematoma at the operative site.

Both cases 1 and 2, particularly the latter, emphasize the importance of careful collection and rapid administration of blood or plasma. The blood must be collected rapidly in siliconized bottles or plastic bags, without foaming and with constant agitation so as to insure continuous mixing of anticoagulant and blood. Blood or plasma must be administered rapidly. Blood or plasma normally will vary greatly in its AHG content (50-150%), and on exposure at room temperature will lose AHG activity rapidly.[15]

Severe bleeding occurring in a hemophiliac treated carefully to attain a satisfactory laboratory AHG level is unfortunately a common problem. The prothrombin consumption test may also be misleading.[16] No satisfactory explanation can be offered for this lack of correlation until more detailed understanding of the interaction of the various components in forming thromboplastin is achieved. It must be remembered that time alone will determine the prognosis in the hemophiliac undergoing surgery and not necessarily the results of clotting studies. Hypervolemia from plasma administration is a complication occasionally encountered in hemophiliacs. This problem may be managed with exchange transfusions of fresh whole blood or plasma, or concentrates of human or bovine AHG may be used.[17] Unfortunately, bovine AHG preparations are not readily available in the United States, and pooled plasma concentrates carry the risk of infectious hepatitis. Fraction 1 of Cohn, containing a high concentration of AHG, may be of help but varies considerably in potency and may also transmit viral hepatitis. Much work is needed to provide better replacement therapy.

Another complication is the development of a circulating anticoagulant as described by Lawrence and Johnson. This is a grave development and is extremely difficult to handle.

Summary

Two known hemophiliac patients survived operative procedures, one for appendectomy and one for goniotomy. These cases emphasize the importance of careful collection and rapid administration of blood or plasma. Although laboratory methods for the assessment of hemophilia are still inaccurate, management of hemophiliacs in recent years appears to be improving. Of 50 cases in the available literature of persons suspected of having hemophilia and in whom major surgical procedures were performed, mortality was 20%. In 24 such cases with proved hemophilia there was a similar mortality. A mortality of 28.6% was found for appendectomy in proved hemophiliacs. In spite of the better preparation and treatment of the hemophilic surgical patient in recent years, any operative procedure in a hemophiliac remains a grave undertaking.

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Dr. Jeanette Schulz granted permission to report case 2.

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TREATMENT OF PARALYSIS AGITANS WITH CHLORPHENOXAMINE HYDROCHLORIDE

Lewis J. Doshay, M.D.
and
Kate Constable, M.D., New York

Chlorphenoxamine was administered to 25 patients with paralysis agitans in a preliminary test to determine dosage and observe side-reactions. Thereafter it was administered to 136 patients who had been treated unsuccessfully with other drugs. It allayed tremor only in the occasional patient, and in some the tremor was accentuated. Its most consistent effect was on akinetic, tired, weak patients, who were enabled to move with greater celerity, strength, and endurance. It stimulated without inducing excitement and relaxed without causing flaccidity or enfeeblement. Three case histories illustrate its effects on the disabling symptoms of the patient. The side-effects observed were neither frequent nor serious. Tolerance did not seem to increase with lapse of time, and the favorable effects continued only as long as the drug was administered.

Argument is often heard that we have more than enough compounds for the treatment of paralysis agitans (Parkinson's disease), and some even claim that hyoscine hydrobromide alone can suffice for the care of all the symptoms of this disease. The fact remains that, despite the addition during the past decade of a half dozen new synthetics—trihexyphenidyl (Artane) hydrochloride,[1] cycrimine (Pagitane) hydrochloride,[2] procyclidine hydrochloride (Kemadrin),[3] benztropine (Cogentin) methanesulfonate,[4] ethopropazine (Parsidol) hydrochloride,[5] and orphenadrine (Disipal) hydrochloride[6]—to the older belladonna preparations, those who treat large numbers of patients who suffer from paralysis agitans feel a dire need for more and better compounds, for various reasons: 1. Many patients, especially those suffering from tremor and akinesia, are not helped sufficiently by current drugs. 2. People live longer; hence we see increasing numbers of older patients, many of whom cannot tolerate the available remedies. 3. Drugs tend to lose their beneficial effects with the passing of time, so we must have a large assortment of good compounds for replacement. 4. Some patients tire of any remedy during the long siege of the illness and are forever in search of something new. 5. There are increasing indications that neurosurgery is likely to fail in its anticipated promise of relief, so patients in the foreseeable future will of necessity have to rely on medication for any benefits they are to derive from treatment.

This paper will introduce a new drug, chlorphenoxamine hydrochloride, that has proved beneficial to many of our patients whom standard

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From the Neurological Institute of the Presbyterian Hospital and the Department of Neurology, College of Physicians and Surgeons, Columbia University.

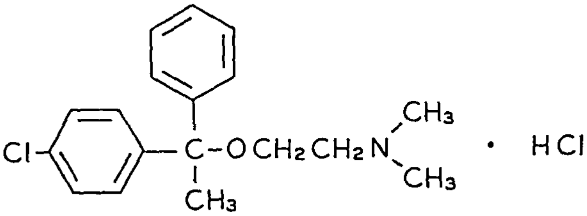
agents for paralysis agitans failed to help. It has been in use in Germany for several years after prior establishment of its therapeutic safety.[7]

Chlorphenoxamine is beta-dimethylaminoethyl (p-chlor-alpha-methyl-benzhydryl) ether hydrochloride. Chemically, it is a derivative of diphenhydramine (Benadryl) hydrochloride, with structure as shown in the figure.

The addition of a p-chlor atom or an alpha-methyl group to the beta-dimethylaminoethyl benzhydryl-ether molecule lessens the antihistaminic action of the compound and increases its anticholinergic action. The addition of both elements serves to accentuate this action. The oral LD_{50} dose in mice is 410 mg. per kilogram, which indicates a high index of safety. Pathological studies of animals that had been fed chlorphenoxamine for long periods failed to reveal any abnormalities in the organs or blood constituents. Hemogram studies in 20% of our patients and cephalin flocculation, thymol turbidity, and urinalysis studies in eight of these patients were all reported normal.

Clinical Material and Procedure

Chlorphenoxamine was supplied to us to determine its possible usefulness in the treatment of this disease. It was provided in the form of 100-mg. capsules and 50-mg. coated tablets. The tablet was found to be more practical and better tolerated and is the form we have continued to use.



Chlorphenoxamine hydrochloride.

The study began with a group of 25 specially selected patients, with the aim of establishing the effects, side-reactions, and range of therapeutic dosage. Some patients, known to possess a high tolerance for drugs, used as much as 600 mg. per day without evidence of side-reactions. Others reported satisfactory results from only 25 mg. of chlorphenoxamine, three times daily, achieved by cutting the tablet in half. However, it became evident early in the study that the optimum dosage for most patients was about 50 mg., three times daily. Some fared better on 100 mg., three times daily, especially the younger postencephalitic patients. It was found better tolerated after meals, with milk, because a few patients complained of indigestion when it was taken with water. There was little occasion for increasing the dosage, as patients tended to remain on therapy with the same amount of drug month after month, indicating that there is little increase in tolerance. In cases where such increase did occur, it was usually after three to six months of use, and the addition of one or two tablets per day served to restore the initial benefits.

The preliminary group of 25 patients was steadily expanded to include 161 patients with paralysis agitans, who were selected only to the extent that they had failed to derive sufficient benefits from other drugs. Among those were 96 males (60%) and 65 females (40%). The youngest was 38 years of age and the oldest 76. In addition to the patients with paralysis agitans, six with senile tremor, three with hereditary chronic progressive chorea with mental deterioration (Huntington's chorea), three with familial hereditary tremor, one with dystonia musculorum deformans, one with hemiballismus, and one with torticollis spasm were likewise studied for the effects of chlorphenoxamine.

The new compound was used alone in 67 patients and was combined with other drugs in 94. Comparisons were made of its action with those of well-known drugs and with placebos. Objective studies were conducted with 12 patients in the laboratory by means of electronic instruments specifically designed for measuring changes in rigidity and tremor.[8]

On the basis of the above studies, clinical observations, and reports from the patient and family, the results of treatment with chlorphenoxamine were classified as failures if no benefits accrued to the patient, if the therapy was discontinued because of side-reactions, or if the patient had not been heard from for more than two months, which meant the allotment of medicament had been exhausted and the patient was dissatisfied. Patients were regarded as "failures" even if they had been on the drug therapy but one day. Since no patient was actually made "worse" by the medicament, no such classification was deemed necessary. The successful results were grouped under the one heading of "improved," because experience has shown that in paralysis agitans it is not desirable to delineate fine shades of change, since the symptoms and behavior of the patient are often influenced by emotional and situational factors and they can vary from day to day.[9] Doubtful and borderline changes were not counted among the successful results. Moreover, no patient was classified as "improved" unless chlorphenoxamine had been used with favorable effects for at least two months.

Results

On the basis of the stated criteria, the results of treatment with chlorphenoxamine are recorded in table 1. It is noted that 53% of the patients were improved. Among those were many who were remarkably benefited by the new compound. The low incidence of disturbing side-reactions made it even more acceptable to the patients. The favorable results were about equally distributed among the older and younger patients (table 2). Thus, 28 (49%) of 58 patients in the 61-70 age range were improved as compared to 15 (55%) of 27 patients in the 41-50 age range. This finding bears special significance, considering that the group of patients with paralysis agitans is becoming increasingly older [10] and that such patients are usually hypersensitive to drugs; hence they respond less favorably than younger patients.

TABLE 1.—*Results of Treatment with Chlorphenoxamine Hydrochloride in 161 Patients with Paralysis Agitans**

Disease Type	Unimproved	Improved	Total
Postencephalitic	14	15	29
Arteriosclerotic	33†	27	60
Idiopathic	29‡	43	72
Total, No.	76	85	161
Total, %	47	53	100

* Fifteen additional patients (6 with senile tremor, 3 with familial hereditary tremor, 3 with hereditary chronic progressive chorea with mental deterioration, 1 with dystonia musculorum deformans, 1 with torticollis spasm, and 1 hemiballismus) were treated with chlorphenoxamine. Only those with hereditary chronic progressive chorea and hemiballismus responded favorably.

† One patient died from a gallbladder operation. Another underwent ultrasonic surgery, so that chlorphenoxamine therapy had to be discontinued.

‡ One patient died from severe burns.

The 47% failures were in large measure accounted for by patients who had tremor as the predominant symptom or those in whom a minimal tremor became accentuated by the drug. Some failures were accounted for by patients who had failed on therapy with all other compounds because of neurotic or unstable components of personality. Still other failures occurred among patients who, through long usage, had become dependent on trihexyphenidyl, cycrimine, or procyclidine hydrochloride and were generally distrustful of a new compound. A few discontinued use of chlorphenoxamine because of genuine concern about side-reactions, such as indigestion, especially where there had been a history of gastric ulcer. Some have not been heard from, and the reason for their dissatisfaction remains unknown.

Aside from numerical findings, the day-to-day experience with the patients served to confirm the outstanding quality of the new product. Not only were the reports highly gratifying but there was a pronounced demand from the patients and family for the drug, to an extent where it was hardly possible to maintain a sufficient supply month after month. This was in sharp contrast to our experience with 10 other new compounds which were being tested at the same time as the chlorphenoxamine. There was no comparable interest in any of the other drugs. Thus, apart from all other considerations, the consistently great demand for chlorphenoxamine was conclusive proof that it was helping the patients more than the other experimental drugs and more than some of the standard agents which they had formerly used.

Chlorphenoxamine exerts a gentle yet potent action, entirely different from that of the parent compound, diphenhydramine. It has a muscle relaxant action far above that of diphenhydramine and also an energizing and stimulating action, without induction of excitement or agitation. Patients are able to move faster and more freely and with greater strength and longer endurance. It helps to loosen rigid muscles, and it successfully counteracts akinesia, tiredness, and weakness. While in an occasional patient it served to allay tremor and excitement, it had the least satisfactory action against tremor, which in fact it tended to accentuate in 16 patients when used alone. However, with addition of ethopropazine or diphenhydramine it was found possible to keep tremor under satisfactory control, sometimes even with the addition of small doses of trihexyphenidyl.

Chlorphenoxamine helped to relax spasm and cramps of somatic origin and was especially beneficial to those who suffered from visceral spasms, or so-called inner tension and tremor. Some patients with frequency and urgency of urination obtained striking relief from its use. The muscle relaxant action is seemingly of a gentle nature, since even in large doses there was no evidence of enfeeblement or flaccidity. The usual duration of action was four to six hours and the onset of action about 30 minutes. However, a few patients were maintained comfortably on one tablet a day.

A number of patients (67) found it possible to discontinue use of all former remedies and to function successfully in their occupations and everyday activities with use of chlorphenoxamine alone. Others found it more advantageous to combine it with trihexyphenidyl (30 patients), benztropine methanesulfonate (25), procyclidine (12), cycrimine (10), ethopropazine (10), and diphenhydramine (5). It combines readily with all agents used for paralysis agitans. Of the 15 patients with extrapyramidal syndromes not associated with paralysis agitans, only the patient with hemiballismus and the two with hereditary chronic progressive chorea with mental deterioration responded favorably.

TABLE 2.—*Age of Patients in Relation to Results of Chlorphenoxamine Treatment*

	Age, Yr.					Total	
Type of Results	31-40	41-50	51-60	61-70	71-80	No.	%
Unimproved	2	12*	23†	30‡	9	76	47
Improved	2	15	34	28	6	85	53
Total	4	27	57	58	15	161	100

* One patient died from severe burns.

† One patient underwent ultrasonic surgery and chlorphenoxamine had to be discontinued.

‡ One patient died from a gallbladder operation.

Report of Cases

Chlorphenoxamine was so effective in most patients with paralysis agitans that it is considered desirable to submit several illustrative cases that, in addition, will provide details of the administration, dosage, and side-effects.

Case 1.—A 57-year-old man had idiopathic paralysis agitans. In 1949 he began to experience some difficulty in writing. This was followed by tremor and rigidity of the right arm and leg, which rapidly spread to involve the trunk and left limbs. In addition there was marked akinesia; frozen facies; labored speech; and contractures in the spine, neck, and limbs. He could not dress or feed himself without assistance, and when he was placed on his feet, his gait was propulsive and he tended to fall. He became totally disabled for work in 1955. Therapy with a variety of drugs, including trihexyphenidyl, benztropine methanesulfonate, cycrimine, and orphenadrine, in turn, had been tried, but his tolerance was poor and he rejected all medicaments on complaint of dryness and mental fogginess. For the past three years he had relied almost entirely on physiotherapy for relief. In June, 1958, therapy was started with a 100-mg. capsule of chlorphenoxamine, three times daily, and when seen a month later he showed remarkable change. His mind was sharper, his movements freer, and his gait steadier, and he was able to smile and talk. There was a release of automatic movement so that he was able to get out of a chair with ease and spontaneity. He then began to take two 50-mg. tablets three times a day and has continued to the present in a more vigorous, active, and happier state than he has been in many years. There have been no side-reactions.

This man could not tolerate standard agents and yet found it possible to accept large doses of chlorphenoxamine with benefit and without a single complaint of side-reactions. A euphoric element appeared among the effects in this as in many other cases. It is difficult to be certain whether this is a direct action of the drug or whether it is secondary to the physical improvement. It would seem to be primary.

Case 2.—A 55-year-old woman had suffered from postencephalitic paralysis agitans since 1925, when drowsiness and tremor of the right hand appeared. During succeeding years came rigidity of the trunk and right limbs, sialorrhea, drooling, and monotone speech. Vaccines were tried without avail and, later, massive doses of atropine and Bellabulgara. More recently, trihexyphenidyl was used, but by 1956 contractures appeared in the neck, spine, and legs, and the body became bent. Rigidity and akinesia progressed to a point where the patient was barely able to get out of a chair, and her gait became propulsive and stumbling. Other preparations were tried, among them benztropine methanesulfonate, cycrimine, and orphenadrine, with only temporary relief, and the patient returned to therapy with trihexyphenidyl. In April, 1958, 50 mg. of chlorphenoxamine, three times daily, was added to the 10 mg. of trihexyphenidyl, three times daily. The effect on tremor, rigidity, akinesia, and drowsiness was dramatic. Her mind sharpened, she moved with greater speed and freedom, and her speech became clearer. She was able to get in and out of bed; before she had been unable to do so. She felt stronger and happier. In August she ran out of her allotment of chlorphenoxamine and again became rigid, with her body bent, and in an effort to get out of bed she fell and injured her side and head. On continuing therapy with chlorphenoxamine, she regained the original improvement and has continued to do well.

The above case illustrates the manifold actions of the new compound, even against tremor. It especially points up the fact that when medication is discontinued, all benefits cease; hence the need for continuous medical supervision and treatment of patients with paralysis agitans.

Case 3.—A 60-year-old man suffered from idiopathic paralysis agitans of eight years' duration. His chief problem was tremor of the left arm, with increasing rigidity in the left limbs. He was sensitive to all medicaments, and even small doses caused nausea and dryness and made him feel "dopey" and weak. In February, 1958, therapy with 50 mg. of chlorphenoxamine was tried with 1 mg. of benztropine methanesulfonate, twice daily. After a week he complained of indigestion and an upset stomach. The chlorphenoxamine therapy was discontinued. A month later it was tried without benztropine methanesulfonate and the effect was "marvelous." He became more relaxed and stronger, and his appetite improved. "If I could only stay this way for the rest of my life" was his comment. He has taken chlorphenoxamine, 50 mg. three times a day, for the past seven months and there have been no further complaints of indigestion.

The above case shows the lasting good effects of chlorphenoxamine and indicates that it can be used alone to better advantage in some sensitive patients than when combined with other compounds.

An instance of failure and a common problem are illustrated in case 4.

Case 4.—A 63-year-old man had bursitis of the left shoulder three years ago; it improved with x-ray treatment. Shortly after came a general slowing down of the body and a shuffling, stumbling gait. His left arm, and later the right arm, became tightened and drawn upward across the abdomen. He was given a diagnosis of arteriosclerotic form of paralysis agitans. He was treated with 2 mg. of trihexyphenidyl, three times daily; he discontinued this therapy after a week because of dryness and mental confusion. Later therapy with a combination of 1.25 mg. cycrimine and 25 mg. of phenindamine (Thephorin), three times daily, was tried, which after a favorable interval had to be abandoned because of complaints of "dopiness," dryness, and blurring of vision. He returned to therapy with one tablet of trihexyphenidyl a day. By this time tremor appeared in his arms, and he was placed, in turn, on therapy with ethopropazine, diphenhydramine, and hyoscine, to all of which he was sensitive. In August, 1958, he experienced cramps in his legs. Benztropine therapy was tried and had to be discontinued because of mental confusion. He was thereupon given 50 mg. of chlorphenoxamine, three times daily, after meals. He reported that the first tablet made him very drowsy and that the second tablet put him to sleep "for two days" so that he could not work in his candy store. He returned to therapy with one tablet of trihexyphenidyl per day, which could not possibly combat his advanced symptoms.

Here we could see neurotic and hypersensitive components in the personality operating as severe obstacles to better therapy.

Side-Reactions

There was not a single instance of dangerous or toxic effects among the 161 patients with paralysis agitans under treatment with chlorphenoxamine. Such side-effects as occurred from its use were of minimal degree and of no greater frequency than those encountered with standard agents. Ten patients complained of indigestion; eight, drowsiness; six, dryness of the mouth; four, nausea; four, dizziness; and two, anorexia. A total number of 28 patients (17%) offered a total of 34 complaints. Chief among the complaints were indigestion, drowsiness, and dryness of the mouth. The indigestion was largely corrected by having the patients take the medicament after meals and with milk instead of water.

It is of interest that no objective pupillary changes occurred, even among patients who were using as much as 600 mg. of chlorphenoxamine a day; nor was there a single complaint of blurring of vision. On this basis, chlorphenoxamine may be considered an ideal drug to use in patients with paralysis agitans who also suffer from glaucoma.

Comment

We stand in great need of drugs that will successfully counteract akinesia, adynamia, mental sluggishness, and lack of mobility in patients with paralysis agitans. In fact, some neurosurgeons have reached a decision not to operate in such situations, because even after reduction or elimination of rigidity and tremor the patients are almost as disabled as they were before the operation. While we possess several drugs that can combat these symptoms, it so happens that orphenadrine has a tendency to lose its good effects rather rapidly in some patients; dextro amphetamine (Dexedrine) sulfate often causes excitation and disturbing palpitations; methylphenidate (Ritalin) hydrochloride helps an occasional patient only when used in large doses of 20 or 40 mg.; and amphetamine (Benzedrine) sulfate causes cardiocirculatory reactions in the older patients.

In this setting, chlorphenoxamine has proved a valuable addition to current remedies because it exerts a gentle, stimulating action that continues month after month in a high percentage of patients in whom it proves effective. It is especially good to use in patients in whom the effects of orphenadrine have worn off. It affords energy, greater freedom of motion, more strength of body, and a general feeling of well-being that lasts throughout the day. True, it does not perform as would be desired in all cases, but then no drug has yet been discovered that is effective in 100% of patients with paralysis agitans. Experience has shown that if a new drug provides 30% of patients greater benefits than they were able to obtain from available compounds, it has clinical merit. Because chlorphenoxamine is a nontoxic compound and because it affords relief to 53% of patients who were insufficiently helped by current remedies, it is a worthy addition to the armamentarium of preparations for paralysis agitans.

Summary and Conclusions

A new drug, chlorphenoxamine, has been shown by studies abroad and in our own series of 161 patients with paralysis agitans to be free of toxic effects. It has positive value in the treatment of the disease. It is especially effective against rigidity, akinesia, fatigue, depression, and weakness, but less against tremor. It provides the patient with more energy and strength, greater freedom of motion, and longer duration of activity than most current remedies. Increased tolerance is comparatively rare and does not appear before three to six months of use. The method of administration and posology are presented and illustrated by case records. The side-reactions are minimal. It is of little benefit in non-Parkinsonian extrapyramidal diseases. The findings indicate that chlorphenoxamine is a valuable addition to the armamentarium of drugs for use in patients with paralysis agitans. It can be used alone or with other agents, such as trihexyphenidyl (Artane) hydrochloride, cycrimine (Pagitane) hydrochloride, procyclidine hydrochloride (Kemadrin), benztropine (Cogentin) methanesulfonate, or ethopropazine (Parsidol) hydrochloride.

710 W. 168th St. (32).

The chlorphenoxamine used in this study was supplied by the Pitman-Moore Company, Division of Allied Laboratories, Inc., Indianapolis. It will be marketed under the trade name of Phenoxene.

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CLINICAL NOTES

STATISTICAL METHOD FOR DETERMINATION OF OVULATION TIME IN WOMEN

Donald S. Murray, Ph.D., Philadelphia

The data developed by Sevag and Colton for their paper "Simple Chemical Method for the Determination of Ovulation Time in Women," which appears in this issue of THE JOURNAL, page 13, offer the opportunity to test the possibility of applying a simple technique of linear correlation to estimate the day of ovulation. The data studied were limited to normal full-term pregnancies where conception was achieved by therapeutic donor insemination. In addition, all patients having menstrual cycles of less than 23 or more than 34 days were eliminated from consideration. Data beyond these limits appeared to be sufficiently unusual as to warrant their exclusion from a study that seeks to determine whether any typical relation exists between the length of the menstrual cycle and the day of ovulation.

Average Length of Menstrual Cycle and Day of Ovulation for Sixty-seven Women

	Average Length of Cycle in Days, No. of Women												
Day of Ovulation	23	24	25	26	27	28	29	30	31	32	33	34	Total
10			1	2									3
11			1	3	2	3		1					10
12	1		1	3	1	6	1	1		1			15
13					2	6	4	3		1	1	1	18
14						4	3	3	3	2		1	16
15									2			1	3
16							1				1		2
Total	1	0	3	8	5	19	9	8	5	4	2	3	67

Sixty-seven patients met the criteria concerning manner of conception and length of the menstrual cycle. These patients had a mean cycle length of 28.7 days and a mean day of conception of 12.8 days as compared with 29.0 days and 12.7 days, respectively, for all cases in which conception took place. The table presents the cases of these patients, classified on the basis of the average length of the menstrual cycle and the day on which conception occurred.

With the average length of the menstrual cycle as the independent variable the following measures are obtained: regression equation: $Y_c=2.2+0.37X$; standard error of estimate, 1.1; and coefficient of correlation, 0.63. In using this regression equation the average length of the menstrual cycle is substituted for X, and the Y_c value obtained indicates the likely day of ovulation. It may be expected that approximately two-thirds of the cases will lie within a range of ± 1 standard error of estimate. The coefficient of correlation, which in this case differs significantly from zero, is an indication of the relationship or association between the average length of the cycle and the day of ovulation.

To illustrate the use of these measures let it be assumed that a woman has an average menstrual cycle of 30 days. Substituting this for X in the equation gives day 13.3 for Y_c, i. e., ovulation is most likely to occur during the 13th day. The standard error of estimate indicates that in approximately two-thirds of the cases ovulation would occur for such a person not earlier than day 12.2 nor later than day 14.4.

From these statistical measures several observations can be made. First, the data tend to confirm the findings of Sevag and Colton that ovulation (as judged by successful inseminations) occurs between the 10th and 15th day for nearly all cases regardless of the length of the menstrual cycle. Using the extremes of length of the cycle for the 67 cases studied, 23 days and 34 days, the range of the day of ovulation runs from 10.7 to 14.8, i. e., essentially the same results as the Sevag-Colton paper indicate. Second, the amount of change in the day of ovulation for a one-day change in the average length of the menstrual cycle is slightly more than one-third of a day.

Meaning of Statistical Measures

The value of the regression equation that has been developed lies in the fact that it permits one to determine the probable date of ovulation when

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From the Wharton School and the Institute for Cooperative Research, University of Pennsylvania.

the chemical procedures described in the Sevag-Colton article are not available. Although in their article they indicate that ovulation seems most likely to occur between cycle days 10 and 15, the use of the equation permits a more critical determination that takes account of the length of the menstrual cycle, e. g., for a 24-day cycle ovulation can be expected on day 11.1, whereas for a 32-day cycle the day of ovulation might be expected to be 14. For the person interested in determining dates in the absence of the availability of chemical tests such variation could be of significance.

FEBRILE REACTION TO PROCAINAMIDE THERAPY

Edgar F. Luton, M.D., Memphis, Tenn.

Since procainamide (Pronestyl) was introduced in 1950, four instances of febrile reactions to this drug have been reported. Review of these and details of another well-documented case are presented in order to delineate the characteristics of the reaction and the type of investigation necessary to establish the diagnosis with a reasonable degree of accuracy.

In each of these cases, the appearance of the febrile reaction was rather prompt. It occurred within the first 24 hours after administration of the drug and it disappeared within 24 hours after the drug therapy was discontinued. The appearance of fever and general malaise in patients with recent myocardial infarctions in two of the cases reported led to investigation for cause of the fever other than the presence of a febrile reaction due to the drug. This is likely to be the course taken under circumstances that were present at that time, and, if it is not borne in mind that febrile reactions to procainamide can occur, such investigations may be extensive and futile. When discontinuation of the drug therapy is followed by clearing of the febrile reaction, one cannot assume that this is proof of a febrile allergic drug reaction. After the symptoms have been reproduced on administration of the drug and seen to disappear on discontinuation of administration for a total of three occasions, it is reasonable to conclude that one is dealing with an allergic febrile reaction. Myocardial infarction is a serious illness and complications deserve serious consideration. The clinical picture and investigation of such a reaction to procainamide therapy are illustrated in the following case report.

Report of a Case

A 61-year-old male was admitted to the hospital on Feb. 15, 1957, because of progressive dyspnea of about two months' duration. He had been hospitalized in January, 1952, with an acute myocardial infarction. During that hospitalization he had numerous premature ventricular contractions and was given procainamide, 500 mg. every four hours, or every six hours, for a period of four weeks. The drug therapy was discontinued after four weeks. He had been hospitalized later because of symptoms of angina pectoris and was found to have a low cardiac reserve.

On admission, physical examination revealed moist inspiratory basal rales, moderate cardiac enlargement, and a trace of ankle edema. He was observed to have frequent premature contractions, which on electrocardiographic study were demonstrated to be ventricular premature contractions. The signs and symptoms of congestive heart failure disappeared on bed rest, a low-sodium diet, and an occasional injection of meralluride (Mercuhydrin). On March 6, 1957, procainamide therapy, 250 mg. every six hours, was begun because of the premature ventricular contractions. On March 7, he had a chill and for the next 11 days felt poor generally. He complained of weakness, anorexia, general malaise, and febrile sensations, and he had run an elevation of temperature almost constantly. On March 18, the drug therapy was discontinued and within 24 hours the patient felt much better. His appetite improved, and he no longer complained of generalized aching and sensations of fever. His temperature became normal.

On three subsequent occasions the patient was given procainamide with definite febrile responses beginning about 12 hours after the first dose. The procainamide was given in doses of 250 mg. every four hours for a variable number of times. When he was given only 250 mg. for one dose, he did not have any reaction. If it were given for two doses, he would have a chill and fever. Dummy capsules of the same appearance but containing lactose did not give a similar reaction. To document the febrile

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From the Medical Service of the Veterans Administration Medical Teaching Group Hospital (Kennedy).

reaction clearly, the patient's temperature was taken every four hours day and night. During this time it ranged between 96.2 and 98.0 F (35.7 and 36.7 C). No change in temperature or symptoms appeared on administration of the dummy capsules, but when he was given procainamide, 250 mg., at 8 a. m., and this was repeated at noon, a chill was experienced at about 9 p. m. His temperature was 101 F (38.3 C) at 12 midnight, 100 F (37.8 C) at 4 a. m., and normal at 8 a. m. and remained normal for the next two days.

The patient declared that the first sensation of the reaction was a tingling and generalized feeling of nervousness, followed by general malaise and nausea. At the same time he would develop a definite diuresis. When he was observed at these times he appeared to have peripheral vasoconstriction. His skin was pale and moist. Chill and fever then appeared. He had no diarrhea and no vomiting; his blood cell count did not change. Procainamide did not have any appreciable effect on the premature ventricular contractions. Results of a patch test were negative to procainamide. Further skin testing was not done, since it is well known that skin tests are not reliable in drug reactions of this type.

Comment

The first report of febrile reactions to procainamide was by Leibowitz[1] in 1951. He reported the case of a 48-year-old businessman with episodes of tachycardia not responding to quinidine. The patient was given 500 mg. of procainamide four times daily, and within a week he reported experiencing weakness and sweating during the day and shaking chills and fever in the evenings. He stopped taking the drug and suffered no further chills and fever until he was advised to reinstate the medication and within 24 hours experienced another shaking chill. Procainamide administration was discontinued and within 24 hours his temperature was normal. Attempts to induce him to take it again were unsuccessful.

In August, 1952, two cases of febrile reaction to procainamide given orally because of premature contractions were reported.[2] One of the patients had had a recent posterior myocardial infarction and was on anticoagulant and procainamide therapy.[2a] An unusually high temperature was noted for five days, and anticoagulant and procainamide therapy was discontinued with the result that within 24 hours the temperature was normal. Improvement in the patient was said to be immediate and dramatic. Aching and malaise, as well as nausea and apprehension, had been experienced, and these were no longer present within 24 hours after the drug therapy was interrupted. Two days later, the patient was given 250 mg. of procainamide at 10 a. m. and by 4 p. m. that afternoon was uncomfortable and irritable and had a temperature of 104 F (40 C). A total of five doses of 250 mg. of procainamide every four hours was given and then the therapy was discontinued. The next day the patient felt normal again and remained so for five days. The therapy was then resumed for the third time, and after the third dose she again developed fever with a maculopapular itching rash. After discontinuing administration of the drug, symptoms disappeared promptly.

The second patient[2b] was a 53-year-old male with hypertension of 20 years' duration who suddenly developed substernal pain and was found to have an acute anteroseptal infarction pattern on an electrocardiogram. He was immediately given a dose of 1.5 Gm. of procainamide orally because of premature contractions. This was followed by 250 mg. of the drug every four hours. After the third dose the patient developed a generalized maculopapular erythematous rash with severe itching, nasal congestion, slight generalized lymphadenopathy and a temperature of 102 F (38.89 C). Procainamide therapy was discontinued and diphenhydramine (Benadryl) given every four hours. His symptoms disappeared within 24 hours. The patient was receiving other medicines at the time of the reaction so he was given procainamide three months later. After the fourth dose of 250 mg. every four hours, the same reaction occurred, and the therapy was discontinued. Results of a patch test were negative.

In December, 1952, McGarry[3] reported the case of a 57-year-old man with an acute myocardial infarction who, after being placed on therapy with 500 mg. of procainamide every four hours from the 5th day after infarction until the 20th day, showed a temperature range between 101 and 103 F (38.33 and 39.44 C). After the procainamide therapy was discontinued there was prompt defervescence and striking subjective improvement. After the patient had been feeling well for 72 hours, a test dose of 500 mg. of procainamide, given orally, produced a recurrence of fever with nausea, headache, and joint pains which subsided within eight hours.

Procainamide was introduced in 1950 as a treatment for cardiac arrhythmias, and in the subsequent years it has become widely used because it has been effective and relatively nontoxic. It was developed as a substitute for a procaine which had previously been shown to have an antiarrhythmic myocardial action but had the undesirable properties of being short in duration of action and stimulatory to the central nervous system. Procainamide has rather rapid and complete gastrointestinal absorption and is slowly metabolized when compared with procaine. Untoward side-effects, such as anorexia, or nausea and vomiting, as well as a tendency to sometimes produce a hypotensive state, are features of administration of this drug that are well known. Among the rather rare side-effects of administration of procainamide are ventricular fibrillation, ventricular tachycardia, and allergic reactions. Included in the allergic type of reactions thus far reported are rashes, asthma, and fever. Agranulocytosis, which has been reported, might also be an allergic reaction.

Park Avenue and Getwell Street (15).

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THE FERTILITY TESTOR

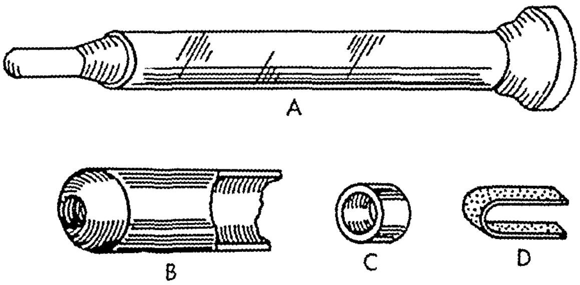
Joseph B. Doyle, M.D.
and
Frank J. Ewers, M.D., Boston

In previous issues of The Journal it has been demonstrated that the fertile period of the menstrual cycle can be concurrently identified by detecting a rise in the glucose content of the cervical mucous cascade utilizing Tes-Tape (paper impregnated with the enzyme, glucose oxidase) on either a swab[1] or a tampon.[2] Gluconic acid, the end-product, is converted to hydrogen peroxidase which, in the presence of traces of orthotolidine, produces a blue color that can be seen as shades of green when viewed on a yellow strip. The glucose present in the cervical mucus may be partly from aspirated liquor folliculi, but most of it is from glycolysis within the cervix itself.[2] A recent positive test from the cervix and cul-de-sac fluid of a patient who had previously undergone supracervical hysterectomy and bilateral salpingectomy without oophorectomy demands such a conclusion.

Both techniques required further improvement to minimize the contact of the Tes-Tape with glucose originating from the vagina itself. To this end we have successfully used a simple, inexpensive, permanent plastic syringe, like the Fertility Testor (see figure) designed by one of us. (F. J. E.). This consists of a narrow 6-in. hollow barrel perforated at its rounded tip by an orifice through which the strip of Tes-Tape may be thrust into contact with the cervix with the beveled nub of the plunger to which it has been affixed by a small plastic ring.

Method

It is preferable for the physician to introduce the syringe through a vaginal speculum in his office in order to acquaint the patient with the sensation of contact with the cervix. Care must be taken to introduce it into the vagina grasped like a pen, with the plunger inserted only halfway down the barrel, thus eliminating contact of the Tes-Tape strip with the vaginal secretions. Since at ovulation time the cervical mucus is a cascade 2 to 10 times its usual volume and is less viscid and more watery, the glucose-laden mucus bathes the posterior fornix



Fertility Testor. To use, (1) take apart by removing plunger, *A*, from barrel, *B*, then (2) remove ring, *C*, from tip of plunger, (3) measure strip of tape, *D*, from roll to cover entire narrowed tip of plunger, and (4) cover tip of plunger with strip of tape. (5) Hold tape in place by putting ring over tape and tip of plunger, push down ring until it fits snugly (no other fixative is required), and (6) replace plunger halfway into barrel.

From the departments of gynecology and obstetrics, St. Elizabeth's and St. Margaret's hospitals.

of the vagina regardless of the direction of the external orifice of the cervix. After the barrel strikes the posterior fornix the plunger is gently pressed to force the tape through the opening at the tip of the barrel. After three minutes of deep cervical contact the patient is advised to withdraw the plunger and its affixed Tes-Tape through the barrel, thus avoiding contact of the tape with the vagina. Within three minutes after withdrawal the color of the Tes-Tape is compared with the blocks of three shades of green on the side of the Tes-Tape dispenser.

Interpretation.—Any color change appearing along even the sides of the Tes-Tape is significant, for by capillary attraction the glucose solution gravitates to the juncture with the dry Tes-Tape. If no sugar is present it remains yellow; a quantity less than 0.1% will result in pale green (+); and a quantity of glucose over 0.25% will produce a deep green (++) color. The color change is usually best seen in that portion of the Tes-Tape under the plastic ring. The deep green, indicative of a high glucose value, usually occurs synchronously with ovulation.[3] We find it useful to have the patient record her basal oral temperature on a chart each morning and the result of her glucose test below the temperature recording each evening prior to any coitus on every day of the cycle after the cessation of menstrual flow. If the patient must be up during the night, the temperature may be unreliable; but the glucose test is unaffected.

With such a concurrent indicator, the known variability of the relation of ovulation to the basal thermal shift—between two days before, the day of the thermal shift, and two days after it—can be more accurately checked. Actually, the appearance of a + result of the test, indicating a 0.1% glucose level, and the first ++ result, indicating a 0.25 level, usually precede the shift in basal temperature by a day or two. Occasionally the maximal glucose present does not exceed 0.1% (+), which is still significant and may represent the prevention of follicular fluid from reaching the cervix by neurogenic uterotubal spasm.[2]

Fertility Use.—The infertile couple will utilize for first coitus the day of the first + result, since sperm will survive until the day of the first ++ result. Usually the first ++ reaction occurs synchronously with rupture of the follicles as confirmed during culdotomy by simultaneous biopsies of the endometrium and the ovarian follicles or early corpora hemorrhagica (25 cases). A negative test result was seen on three other occasions when there was no ovulation. Similar accuracy of the Tes-Tape glucose reaction has been reported by Birnberg,[1] who obtained 20 successful therapeutic inseminations out of 27 attempts on the first day of the ++ reaction with a single insemination. Though small in numbers these reports suggest valuable consistency and utility of the test.

Its greatest usefulness appears to be for those patients with infertile husbands whose thermal shifts were prolonged, e. g., from day 7 to day 24. Prompt conception followed isolated coitus on day 11 when during the preceding month the glucose pattern was negative to day 9, followed by a + reaction on day 10, a ++ reaction on days 11 and 12, a + reaction on day 13, and negative through the rest of the cycle. An occasional patient may show a ++ reaction all month. However, if preceded by a hot-water douche and drying of the vagina by a tampon, more consistent readings may be obtained. For these patients, and for diabetics, the test may be of limited value. Naturally, use of this method can be no guarantee that pregnancy will or will not occur, since 25% of ova are abnormal and the conceptus does not necessarily nidate properly.

Use in Postponing Pregnancy—Concurrent Ovulation Rhythm Technique.—The highly fertile couple desiring for medical reasons to avoid pregnancy must be advised not to have coitus during the month until four days after the few days of positive glucose tests have ceased. Since one patient had positive glucose tests for four successive months on days 11 and 17, respectively, this test may aid those women who ovulate more than once a month to practice periodic continence (rhythm theory) more successfully by avoiding coitus until after any such secondary positive test.

Further confirmatory studies of the glucose content of the liquor folliculi[2] and tubal and uterine fluids and their relation to the fern pattern, sperm survival, and spinnbarkeit of cervical secretion are in progress.

Summary

An accurate calculation of fertility time can be made by simultaneous use of basal temperature charts and cervical glucose determinations made with use of an inexpensive permanent plastic syringe-like instrument, the "Fertility Testor," which permits the introduction of a strip of Tes-Tape (paper impregnated with the enzyme, glucose oxidase) for assay of glucose from the cervical mucous cascade at ovulation time, without interference from vaginal secretion.

520 Commonwealth Ave. (10) (Dr. Doyle).

The Fertility Testor is available on prescription only from physicians from the Fertility Testor Company, Ottawa, Ill.

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COMMITTEE ON MEDICOLEGAL PROBLEMS

CHEMICAL TESTING PROCEDURES FOR THE DETERMINATION OF ETHYL ALCOHOL

Theodore E. Friedemann, Ph.D., Denver
and
Kurt M. Dubowski, Ph.D., Des Moines, Iowa

This report is chapter 5 from a manual, being prepared by the Committee on Medicolegal Problems, dealing with medical and legal procedures involved in the use of chemical tests for intoxication.

Chemical analysis of the blood, urine, saliva, or breath gives the following information: first, it establishes the presence or absence of alcohol in the body; second, it determines the concentration in body fluids and tissues; third, it permits calculation of the approximate total quantity of alcohol in the body; and, finally, it furnishes the basis for calculation of the approximate volume of alcoholic liquor or beverage which may have been ingested within some hours prior to collection of the sample. Thus, chemical analysis not only furnishes objective data on the presence of alcohol in the body but also checks the reliability of statements with respect to ingestion of alcohol.

Observations on the subject's physical and mental state and the results of chemical tests together constitute the data on which judgment of the degree of intoxication is made.

Of the more than 200 analytical methods for ethyl alcohol, the majority have many common features with respect to such unit operations and unit processes as distillation, oxidation, and determination of the degree of oxidation. The majority depend on two important properties of alcohol: volatility and oxidizability. All methods, however, depend on one or more physical or chemical properties of alcohol, and all use one or more basic unit operations and unit processes for differentiation of alcohol from other compounds and for determination of ethanol identity and quantity. The differences between methods are largely in the combinations of the unit operations and in the details within each unit operation. The methods differ greatly in simplicity, speed, accuracy, specificity, sensitivity, and applicable range of concentrations. They therefore vary considerably in their adaptability to clinical and forensic problems.

The existing methods, although large in number, fall into two categories: laboratory tests, applied principally to the analysis of blood, urine, and saliva; and on-the-spot tests, applied to the analysis of exhaled breath. Both categories of methods require not only understanding of the chemical principles but also skill in the chemical and instrumental manipulations. The laboratory should be well planned and organized; the equipment must be adequate; the analyst should possess training and experience at least equivalent to that of the clinical laboratory technologist, and preferably be a professional analytical chemist; and over-all supervision (or frequent consultation) should be maintained by an experienced toxicologist, clinical biochemist, or pathologist.

Basic Principles of Chemical Tests

All methods for the determination of ethyl alcohol in biological materials include several common elements: (1) sampling, including collection of exhaled air, body fluid, or other constituent, and measurement of the aliquot to be analyzed; (2) separation of ethyl alcohol from the biological material of the sample aliquot; and (3) quantitation of the separated alcohol. Some alcohol methods, particularly those for forensic application, include a fourth step: identification of ethyl alcohol and/or any possible chemically interfering substances as sample components.

Sampling.—Careful sampling, preservation, and handling are fundamental to accuracy. The identity and integrity of the sample must be maintained from the time of collection until analysis. This aspect of laboratory tests is far more exacting and difficult than that of on-the-spot tests, in which samples of exhaled breath are collected and immediately analyzed, but not stored. However, this feature of the laboratory tests not only permits many analyses by the same method in the same

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Technical Director, Headquarters, U. S. Army Medical Research and Nutrition Laboratory, Fitzsimons Army Hospital (Dr. Friedemann); Director of Chemistry, Iowa Methodist Hospital and Raymond Blank Memorial Hospital for Children, and Criminalist, state of Iowa, Department of Public Safety (Dr. Dubowski). Dr. Dubowski is now at the J. Hillis Miller Health Center, University of Florida, Gainesville.

laboratory, or redetermination by other methods, but also allows independent analysis in other laboratories.

Removal of Alcohol from Sample.—The techniques for removal of alcohol fall into three categories: diffusion-desiccation, aeration, and distillation. The latter includes simple distillation, steam distillation, and distillation under reduced pressure.

Diffusion-Desiccation.—The most widely known diffusion procedure is that of Widmark.[1] The sample is placed into a small glass cup which is suspended in a sealed flask containing oxidizing solution. In the Conway desiccation procedure, the apparatus consists of a covered cylindrical glass or porcelain dish with a center well. The sample is placed in the space surrounding the center well, which contains the oxidizing solution.

Aeration.—Aeration of the sample at room temperature and bubbling of the vapor through potassium dichromate and sulfuric acid solution or other oxidizing reagent has been used,[2] as has aeration at elevated temperatures, which shortens the required aeration time.[3]

Distillation.—Distillation of alcohol from the sample may be carried out with heat and evacuation or with steam.[4] The recovery of alcohol by these methods has not been as good as by simple distillation at atmospheric pressure; the apparatus for vacuum and steam distillation is more complicated, and the operation requires more attention and time. The recovery of alcohol by direct distillation at atmospheric pressure is quantitative, or nearly so; this procedure is therefore preferred.

Prevention of Foaming During Distillation.—Foaming is always encountered during distillation of untreated biological materials. It not only slows the rate of distillation but also may lead to considerable entrainment of impurities into the distillate. Precipitation of blood and tissue proteins eliminates foaming almost entirely.

Harger[5] precipitates the proteins by sodium tungstate and dilute sulfuric acid; an aliquot of the protein-free filtrate is then distilled. Trichloroacetic acid and other precipitants have been similarly used. Friedemann[6] has obtained an efficient precipitation by adding an acid mercuric sulfate–copper sulfate–ferric sulfate reagent to the sample, followed by adding calcium hydroxide suspension. The reagent removes sugars, primary and secondary amines, amino acids and proteins, sulfhydryl compounds, ketones, ketoacids, aldehydes, and many phenols. The filtrate from saliva may be analyzed directly without distillation.[6]

Direct distillation of the sample without previous precipitation of protein and filtration is preferred by most authors. The precipitant or antifoaming agent is added to the sample in the distilling flask. Picric acid is the oldest and perhaps most widely used antifoaming agent, but tartaric acid, both picric and tartaric acid, phosphoric acid, paraffin, mineral oil, and silicones have also been used.[7] The presence of high salt concentrations facilitates volatilization according to some analysts, who add large quantities of ammonium sulfate or sodium sulfate.

Tungstic acid and mercury salts are the most efficient precipitants and antifoaming agents, some analysts preferring the use of a combination of acid mercuric sulfate and tungstic acid, which permits rapid distillation of blood and urine samples without foaming.

Removing Interfering Substances from Distillates.—The most important volatile substances in forensic samples of blood and urine are organic acids, aldehydes, ketones, and phenolic compounds. Examples are formic, benzoic, and salicylic acids; formaldehyde and acetaldehyde (and paraldehyde, which readily decomposes to acetaldehyde when distilled with acid); acetone; and "carbolic acid" and menthol. The distillate may be treated with freshly precipitated silver oxide, which is added to the approximately neutral distillate and allowed to stand for some time before redistillation. For many years this has been a standard procedure for removing aldehydes and ketones. Silver oxide slowly oxidizes methyl and ethyl alcohols to the respective acids.

It has also been found that freshly precipitated mercuric oxide in approximately neutral solution efficiently removes aldehydes and ketones; during four or five hours' refluxing with the reagent, 3 to 5% of alcohol is lost. Greater quantities are lost at high alkali concentrations. Mercuric oxide has been similarly used. Some analysts recommend the addition of mercuric sulfate and an excess of calcium hydroxide suspension to the distillate. No loss of alcohol is noted at the approximately 0.08 *N* alkalinity of calcium hydroxide suspension.

Quantitative Determination of Separated Alcohol.—In all published alcohol methods quantitative determination of separated alcohol depends on one or more of the following analytical principles:

1. Isolation of ethyl alcohol and measurement of its mass or volume in pure form.
2. Determination of the physical properties of a distillate or vapor phase containing ethanol (e. g., by gas chromatography, interferometry, mass spectrometry, polarography, or measurement of specific gravity or refractive index.
3. Pyrogenic dehydration of ethanol to ethylene, followed by bromination, liberation of free iodine, and measurement of the latter.
4. Formation and estimation of iodine derivatives of ethanol (e. g., iodoform, ethyl iodide, etc.).
5. Conversion of ethanol to ethyl nitrate and measurement of hydrolysis of the latter by release of free iodine from potassium iodide.
6. Oxidation of ethanol to acetaldehyde and quantitation of the latter.

7. Enzymatic dehydrogenation of ethanol with alcohol dehydrogenase with simultaneous reduction of diphosphopyridine nucleotide (DPN) to dihydro-DPN, and measurement of the latter by ultraviolet spectrophotometry.

8. Oxidation of ethanol with a known standard oxidizing reagent to a predetermined color endpoint.

9. Oxidation of ethanol to acetic acid with an excess of oxidizing reagent and determination of the ethanol oxidized from the quantity of oxidizing reagent reduced as determined from the quantity of reaction products resulting, or by measurement of the excess of oxidizing agent remaining (by titration, photometry, spectrophotometry, visual color comparison, etc.).

10. Oxidation of ethanol to acetic acid and titration of the latter.

The last three procedures are employed most widely at present and therefore will be discussed briefly.

Oxidation of Isolated Alcohol: Choice of Oxidizing Agent.—Potassium permanganate, iodine pentoxide, and potassium dichromate are the most commonly used oxidizing agents.[8] Permanganate oxidation in acid solution is used in the Drunkometer on-the-spot test. Complete oxidation is accomplished rapidly. The reaction is sensitive, reproducible, and not noticeably affected by the small quantities of volatile substances other than alcohol which may be present in the exhaled breath of normal and intoxicated persons.

On the other hand, permanganate oxidation in alkaline solution is not specific for alcohol, yielding oxalic acid and carbon dioxide with alcohols, aldehydes, acetone, and other readily oxidizable substances. After alkaline oxidation, the solution may be acidified, which further oxidizes the oxalic acid to carbon dioxide. The residual permanganate is determined by various methods. The procedure is quite specific for alcohol if preceded by distillation from tungstate and acid mercuric sulfate and by redistillation from mercuric sulfate and lime, which removes (see above) most of the interfering classes of compounds.

Oxidation by iodine pentoxide has also been used.[9] The oxidation, which is carried out at high temperature, requires careful regulation and produces carbon dioxide and water. It is similarly complete for many other substances and therefore is not specific for alcohol. The oxidation is highly sensitive and reproducible. It is applicable only to determination of alcohol in vapors, and it is the basis for the Alcometer on-the-spot test for alcohol in breath.

The majority of methods employ oxidation by potassium dichromate in sulfuric acid solution. However, this oxidation has also been carried out in nitric acid and in phosphoric acid. The relative rates and the degree of oxidation of alcohol and other organic compounds (and therefore the specificity for ethyl alcohol) are affected by acid concentration and temperature.

At concentrations above 20 *N*, sulfuric acid (concentrated sulfuric acid has about 36 *N* titratable acid) dichromate yields acetic acid from ethyl alcohol, which is further oxidized to carbon dioxide and water. The greater the acidity the greater the rate, until, in concentrated acid, the complete oxidation to carbon dioxide is rapidly accomplished. Twelve oxidizing equivalents are used per mole of ethyl alcohol. In concentrated acid most other organic compounds are also oxidized quantitatively. Thus, the dichromate oxidation, although possessing maximal sensitivity, is nonspecific at high acid concentrations.

As the sulfuric acid concentration is decreased below 20 *N*, the interfering effect of many volatile substances like acetone, ether, and chloroform becomes negligible. Thus, ethyl alcohol is oxidized quantitatively to acetic acid by dichromate at 18 *N* acidity. The reaction has high specificity but is slower and only one-third as sensitive as in concentrated acid solution.

Oxidation of Isolated Alcohol: Colorimetry, Spectrophotometry, and Titrimetry.—The final step in all oxidative methods is a measurement by either chemical or instrumental means. In the majority of titrimetric methods the oxidation is carried out with excess dichromate, followed by determination of the residual dichromate by various methods. Some add potassium iodide and titrate the liberated iodine with standard sodium thiosulfate solution. Direct titration of the excess dichromate may also be done with potassium ferrocyanide in the presence of diphenylamine or with standard ferrous sulfate solution using such indicators as *o*-phenanthroline. The color of the reaction mixture after oxidation may be compared visually with known standards or measured photometrically.

In some of the earliest chemical methods, the volatile acidity was determined by distillation and subsequent titration by standard alkali. Aliphatic alcohols, such as ethyl alcohol, produce the respective fatty acids. Thus ethyl, propyl, and butyl alcohols produce acetic, propionic, and butyric acids respectively. Each of these acids has a characteristic rate of distillation. Each also has a characteristic distribution between water and various solvents. From the titration of total volatile acidity and the observed distribution, the respective alcohol may be identified and determined quantitatively.[10]

Sampling for Laboratory Tests

Choice of Specimen Materials.—The source, type, and quantity of specimen for alcohol determination depends on such practical considerations as availability of persons legally and technically qualified to obtain various types of samples, possible necessity for procuring specimens in the field, available laboratory facilities, maximum time allowable for rendition of reports, and the desirability of minimizing the interval between the event in issue and the sampling time. Since alcoholic influence, in those states having statutory definitions, is expressed in terms of the concentration of ethyl alcohol in the blood, and since adequate correlations have been established between degrees of alcoholic influence and blood alcohol concentrations, it seems most direct and acceptable to analyze blood specimens, when possible. The blood alcohol concentration may be determined indirectly by analysis of any other body tissue or of exhaled air, using the known relations of distribution of alcohol between blood and tissues and between blood and alveolar air.

In practice, alcohol analyses are conducted on blood, breath, cerebrospinal fluid, saliva, tissues, and urine. When use of blood as a specimen material is impossible or undesirable, breath or urine specimens are most frequently employed for analysis, each having certain advantages and shortcomings. Thus, obtaining urine specimens from female subjects requires separate facilities and possibly, for forensic purposes, a female attendant able to identify the specimen as to its origin, noncontamination, or nondilution. Breath specimens are not readily collectible in duplicate or in sufficient quantity for later separate independent analyses by systems other than the Intoximeter (which makes such duplicate sampling a relatively expensive procedure) and generally must be analyzed immediately after collection in order to obtain reliable results. In dead persons, it may be difficult to obtain any specimen material, blood usually being the most readily and consistently available.

A number of technical problems must be considered in the use of blood specimens for routine alcohol determinations. During the early stage of alcohol absorption, the concentration of alcohol in arterial and venous blood may vary slightly. It has been suggested that only analysis of peripheral venous blood form the basis of precise interpretations; peripheral venous blood is probably also easiest to obtain in adequate quantities. Capillary blood, properly collected to avoid errors of sampling such as evaporation and dilution with tissue exudate, is also satisfactory, and the results of analysis approach those of arterial blood. Generally, the distribution or concentration of alcohol in the body fluids and tissues at equilibrium is in proportion to the water content.[11] The alcohol content of serum or plasma is about 10% higher than that of whole blood, in accordance with the water content of the body fluids. In any large-scale testing program occasional blood specimens are received which are partially clotted through use of ineffective anticoagulants or faulty sampling technique. Such clotted specimens can be analyzed without difficulty after homogenization.

Analysis of urine is used by many law enforcement agencies and clinical laboratories for the indirect determination of blood alcohol. Aside from the practical problem of collection facilities, two special technical considerations exist: the first is the relation between the level of alcohol in the venous blood and in the ureteral urine; the second is the relation between the alcohol content of the venous blood and of the urine present in the bladder at the time of collection of both, since any single random urine specimen represents a pooled ureteral urine sample, possibly further altered to some extent by alcohol diffusion through the bladder mucosa.[12]

Urine contains about 1.30 times as much alcohol as venous blood.[12] Most valid sampling systems recommend that the bladder be emptied and that one-half hour later the subject again be requested to void. The second sample is analyzed and the result, divided by 1.30, is taken as the concentration of alcohol in the venous blood at the time the test was made.[13] Our recommended routine is to collect two urine specimens at precisely known intervals of from 30 to 45 minutes after an initial complete emptying of the bladder, analyzing both later specimens in order to determine whether the subject's blood alcohol level, if any, was increasing or decreasing during the sampling period.

In estimating blood alcohol levels from urine analysis, one must realize that the levels in the first, second, and later specimens after initial emptying of the bladder represent an average of an infinite number of instantaneous ureteral urine alcohol levels during the entire secretion period of that specimen. Consequently, the blood alcohol level calculated by use of the distribution ratio of 1.30:1 is the blood alcohol concentration at a time midway between the beginning and the end of the collection period in the bladder and not the blood level at the time of voiding. All of these procedures assume that the bladder is emptied completely each time and that no residual urine is retained.

Postmortem Specimens.—In the collection of postmortem specimens, precautions must be taken to prevent contamination of the samples and to minimize changes of the alcohol level after their removal from the body. Enzymatic oxidation of alcohol to acetic acid can and does occur to some extent in the liver both before and after its removal from the body.[14] Alcohol can also be oxidized to acetaldehyde and acetic acid in vitro by brain, kidney, heart, and other tissues.[15] Since the oxidation is an enzymatic process, it can be minimized in vitro by effective refrigeration, preferably freezing at -20 C, which also tends to minimize putrefaction of tissue with attendant bacterial and fungal neoformation of alcohol and other volatile organic substances.[16] On the whole, these changes are small.

It is of considerable advantage to collect several different body materials in order to be able to estimate the stage of alcohol absorption existing at the time of death. Thus analyses of postmortem urine and blood yield considerably more information than either analysis alone. If the alcohol level in the urine exceeds that of the blood by more than 30%, assuming that both analytical results represent the actual levels at the time of death, it is obvious that a blood alcohol level existed at some time prior to death greater than either the urine or blood concentrations found post mortem and that the subject at the time of death was probably in the postabsorptive state with respect to the ingested alcohol. Conversely, if the postmortem blood alcohol level equals or exceeds that of the urine, the subject probably died in the absorptive phase and, therefore, probably within a few hours of the time of alcohol ingestion, which can frequently be fixed with some accuracy.[17] The possible import of such conclusions on explaining the cause, manner, and circumstances of death makes it advisable to collect two or more different body materials for postmortem alcohol determination.

The recommended routine is to collect adequate postmortem blood and bladder urine specimens whenever obtainable and to collect brain tissue and cerebrospinal fluid if those are available, as the next choice. Other tissues, such as liver and kidney, are less desirable but usable.

All postmortem body materials must be obtained prior to the start of any embalming procedure. Embalming fluids always contain considerable quantities of formaldehyde and methyl alcohol as well as other volatile substances, the presence of which in sample materials greatly complicates the analysis of ethyl alcohol; they may contain ethyl alcohol, which would render any postmortem alcohol analysis on embalmed tissues meaningless. Special precautions should be exercised against the frequent custom of collecting a postmortem blood specimen from the circulatory system effluent during arterial injection of embalming fluid.

The site of postmortem blood collection is of some importance, particularly in bodies which have been dead for some time, since it has been established that alcohol diffusion into the blood in the heart and the great vessels can occur from a large amount of alcohol in the stomach.[18] Because of the comparative ease with which adequate volumes of blood can be obtained, the heart and great vessels (aorta, pulmonary artery and vein, and vena cava) are the usual sites of collection, and uncontaminated specimens from these sources are satisfactory.[19] Adequate mixing of heart blood specimens before withdrawal is important; if it becomes necessary to withdraw heart blood from a body without autopsy, precautions against dilution of the blood with pleural or pericardial fluids should be employed. Adequate blood volumes for alcohol analysis can also be readily obtained post mortem from the femoral vein by raising the leg.

Size of Specimen.—With modern, sensitive analytical methods, smaller samples may be collected than formerly were required. Since alcohol is freely diffusible and is distributed in proportion to the water content, homogeneity of the sample is not a factor in the choice of sample size, as in the sampling of, say, food or coal for the determination of total nitrogen or calorie content. As reported by Freimuth and associates,[14b] there is no significant variation in alcohol concentration in different areas of the brain. The sample size is regulated by the quantities required for repeat determinations and for possible future rechecking of the analyses.

If necessary, 1 to 2 Gm. of tissue or 1 to 2 ml. of fluid can be analyzed readily. However, in practice, it is desirable to have larger quantities: 2 to 15 ml. of blood, cerebrospinal fluid, or saliva; 10 to 30 ml. of urine; and 10 to 50 Gm. of brain or other tissue. The sample should nearly fill the container.

Precautions During Collection.—Because of occasional claims in the literature that sterilization of the skin with alcohol can cause an apparent blood alcohol level of up to 0.25% w/w in abstaining subjects,[20] it is good practice to employ a nonalcoholic, nonvolatile skin antiseptic. Actually, controlled laboratory studies have consistently demonstrated that even excessive application of ethyl alcohol to the skin before venepuncture increases the existing blood alcohol level not more than 0.02%. Syringes and needles, of course, must be sterile, completely dry, and free of any trace of alcohol or other volatile substance. Consequently, alcohol, acetone, ether, or other volatile organic substances should not be used for sterilization or drying. Postmortem specimens should be collected with similar precautions except for sterility, and special care must be exercised to prevent contamination with any embalming fluid from needles, syringes, or containers.

Preservation.—From both the legal and analytical points of view, it is desirable to refrain as far as possible from adding preservatives or other substances to specimens. Tissue samples may be placed immediately after removal from the body into individual new, clean polyethylene freezer bags, which are sealed and placed into plastic-lined, cylindrical cardboard cartons and are then preserved solely by storage at −20 C in a deep-freeze refrigerator.[22] With this routine, we have found no change from the original alcohol content of brain tissue after 16 months. Freimuth and co-workers [14b] have demonstrated that storage of tissues in closed glass vessels at ordinary refrigerator temperature (5 C) does not prevent changes from the original alcohol content; the brain alcohol level decreased from 0.22 to 0.12% and the liver alcohol level increased from 0.00 to 0.14% within 14 days.[18]

For preservation of blood specimens, from 0.1 to 1.0% of sodium fluoride (1 to 10 mg. per milliliter) is usually added to prevent glycolysis and other enzymatic changes; this is frequently combined with a supplementary anticoagulant, such as sodium citrate or potassium oxalate, in final concentrations of 0.3 to 0.5%. The following combination of anticoagulant and preservative, used in our laboratories (K. M. D.), preserves the original alcohol content of blood without change for at least 18 days at room temperature, for well over one month when combined with refrigeration at 5 C, and apparently indefinitely when combined with "deep-freeze" storage at –20 C: 150 mg. of sodium fluoride as preservative, plus 1 mg. of heparin sodium as anticoagulant for up to 10 ml. of blood. These salts contained in 4 ml. of stock solution are deposited in film form on the container walls by drying in an oven at 95 to 100 C.[17]

Table 1.—*Alcohol Specimen Identification Form*

NAME OF LABORATORY
CITY AND STATE
See Reverse Side For Directions
PLEASE PRINT ALL INFORMATION

☐
Subject's Rt
Thumb Print

SUBJECT: ....
Last Name First Initial
SUBJECT'S ADDRESS: ....
SPECIMEN: ....
Nature Sample Site
SPECIMEN OBTAINED: ....:.......M............, 195.... by......................
Time Date Collector
EXAMINE FOR: ☐ Ethyl Alcohol Content
☐ Other: ....
CHECK IF APPLICABLE: ☐ Container Unit seal was intact before use
☐ Non-alcoholic, non-volatile skin disinfectant .... was user
REPORT RESULTS TO: ....
REMARKS: ....

FOR LABORATORY USE

CASE NO.: .... SEAL NO.: ....
SUBMITTING AGENCY. ....
RECEIVED AT LABORATORY: ....:.......M.......... ...., 195 ...
Time Date
FROM: ....
BY: ....

Urine is readily preserved with 15 mg. of sodium fluoride per milliliter of urine, combined with refrigeration; with 3.5 mg. of benzoic acid per milliliter; or with 1 mg. of phenylmercuric nitrate per milliliter.

When specimen aliquots are measured by volume for analysis, the effect of the added substances on the original density of the sample can be neglected for all practical purposes, while such is not the case if the aliquots are to be weighed. Addition of the anticoagulants and preservatives in liquid form is obviously not permissible because of the resulting dilution of the original specimen. Sterile handling and storage of specimens, while desirable, is not necessary if the above directions are followed, particularly when combined with effective refrigeration.

Identity of Sample.—In forensic alcohol determinations, certain routine precautions are necessary to provide legally acceptable proof of specimen identity, integrity (absence of contamination or change from its original condition), and preservation of the chain of custody.[23] Identification of the specimen should be complete and definite, preferably by means of a numbered seal or similar device which simultaneously excludes tampering. Minimal information accompanying a specimen for alcohol determination, in addition to a concise statement of the test desired, should consist of the complete name of the subject from whom it was obtained; the nature of the specimen and site from which it was obtained (when applicable); the place, date, and exact time the specimen was obtained; and the name and other necessary particulars of the person obtaining the specimen.

An occasional problem in forensic analyses is the increasing tendency of courts to require positive affirmative proof of the identity of the subject from whom a disputed specimen was obtained, as well as of the identity of the specimen itself, during subsequent litigation, sometimes years later. We have recently placed the right thumbprint of the subject on the sample-identification record as a precaution against such difficulties. A suggested form for identification of specimens is shown in tables 1 and 2. The form has been in use several years in the laboratory of one of us (K. M. D.).

Analytical Significance of Test Results

Correct interpretation of the analysis in terms of actually existing alcohol concentrations at the sampling time is basic to valid physiological evaluation of alcohol test results. Such analytical interpretation of the results of an alcohol analysis is subject to certain purely technical and scientific considerations unrelated to physiological aspects.

The statutory definitions of alcoholic influence or intoxication promulgated in the United States, and expert testimony concerning the same, uniformly express blood and other body material alcohol concentrations in terms of weight/weight per cent. It is, however, universal practice in the United States to perform practically all clinical chemical analyses upon volumetrically measured specimen aliquots. Such volumetric measurement is desirable for technical reasons, such as the change from original density of a specimen material caused by preservatives, and for the expediency of greater speed with adequate precision. If, however, in interpreting the reported tissue or fluid alcohol levels the deviation from weight/weight percentage is not known or considered, significant misinterpretations can occur. Blood, for example, has an average specific gravity of 1.055 and can have an even greater density if the cell volume is unusually high. Thus a blood alcohol level of 0.152 weight/volume per cent (i. e., 1.52 mg. per milliliter) is equal to a level of only 0.144 weight/weight per cent (i. e., 1.44 mg.

per gram). Reported to two decimal places and without specification these values become, respectively, "0.15%" and "0.14%." A hairline legal interpretation made without awareness of the difference caused by the volumetric sampling could conceivably result in a decision different from that which would have resulted from a report on the weight/weight basis, even though the difference is physiologically negligible. The remedy lies in factual reporting of blood and other alcohol concentrations in terms of the actual measurement employed, accompanied either by an estimated recalculation to any other measurement system of interest or, better, by an explanation of the deviation limits attributable to the difference in measuring technique.

Alcohol determination results should include a statement of the precision limits attached to the measurement. This may be done by reporting a given alcohol level to the first doubtful figure and adding the precision limits (e. g., 0.196±0.004% w/w). Reporting only two significant figures (e. g., 0.19% w/w) is preferable, since it is more meaningful physiologically, and is recommended practice. Few, if any, practical alcohol determination methods have a precision greater than 3 to 5% of the alcohol actually present, and reporting of the third significant figure is entirely unwarranted in the physiologically possible concentration range (0.00 to about 0.70% w/w). In expressing the results quantitatively at all, the analyst implies that the report refers to a single determined substance, universally understood to be ethyl alcohol. The validity of such implication depends on the relative specificity for ethyl alcohol of the particular method employed. It is, consequently, good analytical practice and legally desirable to establish experimentally by qualitative tests, to a reasonable degree of certainty, the presence of ethanol and the absence of any substances which could react like ethanol in the analytical system used.

The concordance between a reported true ethyl alcohol level and the original alcohol level in the sample material at the time the sample was obtained is not under the control of the person making a physiological evaluation of an analysis result. The concentration of ethyl alcohol found in body fluids and tissues is a function of the following factors: (1) concentration of alcohol actually present originally; (2) percentage of recovery of actually present alcohol, a characteristic of the individual analytical method; (3) loss of alcohol originally present, after removal of the specimens from the body, from such causes as enzymatic oxidation, and evaporation; and (4) postremoval gain in alcohol as the result of neoformation, by enzymatic fermentation or other factors. In addition, there is the problem of false apparent alcohol concentrations yielded by nonspecific analytical methods, in the presence of various concentrations of volatile reducing bodies produced by decomposition and putrefaction of biological materials, such as aldehydes, amines, ketones, phenols, and sulfides.

It is apparent that during prolonged intervals between the removal of tissues or fluids for alcohol determination and the analysis, particularly in inadequately preserved specimens, the various factors can operate jointly to reduce or obliterate a low original alcohol level, to reproduce accidentally by loss and neoformation the original concentration, or to produce a significant true or apparent alcohol concentration in an originally alcohol-free specimen. The analyst should make every reasonable effort to preserve the specimen until analyzed in as nearly as possible the original state in which it was received by him; and he should indicate in his report factors which might lead to alteration of any original alcohol concentration, such as evidence of sample decomposition or unusual or unidentified specimen odor.

Appendix A presents the details of four laboratory procedures for analysis of tissue and body liquids for ethyl alcohol.

TABLE 2.—*Reverse of Specimen Identification Form*

DIRECTIONS FOR COLLECTION AND SUBMISSION OF SAMPLE

1. This bottle contains sodium fluoride as a preservative and sodium heparin as an anticoagulant; and is suitable for submission of blood, urine, cerebrospinal fluid or other liquid specimens. Do not add anything other than the sample to the container.
2. Use only a sterile, dry, clean syringe and needle for obtaining specimens and, where necessary, use only a non-alcoholic, non-volatile skin disinfectant. Place approximately 10 ml. of whole blood or other liquid specimen into the bottle, cap tightly, and gently shake about 1 minute to dissolve the chemicals.
3. Replace the specimen bottle and this completed form into container; then seal cap with the wire and numbered seal furnished. If possible, refrigerate entire container until mailed or delivered to the laboratory.
4. The specimen in its sealed container may be delivered to the laboratory by messenger or sent by U. S. Mail, preferably by "CERTIFIED MAIL—RETURN RECEIPT REQUESTED."

On-the-Spot Tests

Characteristics and Application.—The great majority of alcohol determinations on human body materials are performed in connection with the investigation of alleged traffic offenses, chiefly on motor vehicle operators suspected of driving while under the influence of alcohol. While theoretically analysis of any body fluid would suffice for the direct or indirect determination of the blood alcohol concentration at the time of the offense, the indirect determination of the blood alcohol level by breath alcohol analysis has proved to have certain special advantages in these situations.

Inherently, in traffic law enforcement and in a few other special situations (differential diagnosis of intoxication states, particularly in persons in police custody; assessment of fitness for specialized tasks like aircraft piloting, railroading, and industrial operations), it is desirable to obtain immediate information concerning the subject's approximate blood alcohol concentration at the time of the investigation, in order to provide a sound basis for instant corrective or other actions which in many cases have far-reaching effects (e. g., arrest, suspension from employment). Conventional methods for alcohol analysis in body liquids (blood, urine, saliva, etc.) *require relatively elaborate laboratory* facilities frequently not in operation or otherwise unavailable at the time these problems arise, and they usually require longer to perform than it is practical to wait for decisions based on the analysis results. Geographical inaccessibility of such laboratory facilities or even of personnel qualified to obtain blood specimens is a frequent factor in traffic law enforcement, particularly in county and state highway patrol operations.

To provide on-the-spot alcohol analyses of the required reliability and practicability, a number of rapid field procedures have been developed. In practice, because of the requirements for minimal physical facilities and technical proficiency, such on-the-spot techniques are limited to breath alcohol analysis. These breath alcohol analyses all share the following characteristic advantages:

1. A breath alcohol analysis result, usually expressed in terms of the blood alcohol concentration, is obtained within a few minutes.

2. Breath as the analyzed material accurately reflects the actual blood alcohol level at the time of the test, without lag or overrun, and is often obtainable nearer the time in issue than other materials.

3. When breath obtained at the time of the analysis is used as the specimen, the problem of *positively identifying the specimen donor is eliminated*, as are most of the collection, identification, preservation, transportation, and evidentiary safeguard problems common to other body materials, together with the need for specially qualified collection personnel, for special collection facilities and containers, and for most of the precautions outlined in detail in the section entitled "Sampling for Laboratory Tests."

4. Since breath analysis eliminates certain difficult steps of the tissue and liquid alcohol analyses, requirements for technical background and skill of the analyst are greatly reduced.

5. Required test facilities can be minimal and are usually limited to the self-contained breath alcohol apparatus used, costs per test after acquisition of the necessary equipment being generally much lower than for comparable laboratory analysis.

6. There is frequently less objection by the tested subject to collection of a breath sample for alcohol analysis than to the body penetration required to obtain a blood specimen, and generally less cooperation and considerably less time are required than for collection of adequate saliva or urine specimens. The embarrassment connected with obtaining a urine specimen under observation is avoided.

7. Multiple, replicate, and serial alcohol determinations at frequent brief intervals are practical, because of the rapidity and relative simplicity of on-the-spot analyses and the rapid nontraumatic sampling of breath specimens, allowing accurate determination of the directional trend of the blood alcohol curve and *many experimental analyses* on a given subject.

On-the-spot breath analyses also embody a few inherent limitations:

1. Entire breath specimens cannot be effectively preserved for later replicate or independent confirmatory analysis, although the alcohol from a measured volume of breath can be collected and preserved for later analysis.

2. Some cooperation is required from the patient for collection of an adequate breath specimen, the extent varying with the nature of the required breath sample (alveolar air, mixed expired air, or rebreathed air) and the collection apparatus (balloon, sample chamber of apparatus, etc.).

3. Most breath alcohol methods, except, under some conditions, those employing the alcohol–carbon dioxide ratio, are inapplicable to unconscious or completely uncooperative subjects.

4. A period of approximately 10 to 15 minutes after the last ingestion of alcohol (or regurgitation) must elapse before breath alcohol analysis, to insure elimination of the possible effects of any residual mouth alcohol.

These characteristics of the on-the-spot alcohol tests make them highly useful as rapid and simple screening tests to indicate or obviate the need for confirmatory body fluid alcohol determination, such as *blood alcohol determination, and to furnish* approximate blood alcohol level data. Under properly controlled conditions, which include proper training and continuing expert supervision of competent operators and adequate expert control of equipment, reagents, and procedures, the on-the-spot tests are also capable of yielding accurate breath alcohol concentration results, acceptable as an index of blood alcohol concentration of adequate reliability for clinical and legal purposes.[25] The significant human physiological characteristics (blood composition, body temperature, respiratory action, etc.) normally vary within sufficiently narrow limits to permit full realization of this technical potential.[26]

General Principles.—Since the first application of breath alcohol analysis to medical purposes in the United States by Bogen in 1927, a number of breath alcohol analysis methods and devices have been developed. They fall into three functional categories: (1) laboratory alcohol determinations, performed on laboratory-collected breath specimens, or on those collected in the field with on-the-spot breath screening-and-collecting equipment, yielding definitive blood alcohol level results; (2) field (on-the-spot) breath alcohol determinations employing portable apparatus and yielding definitive blood alcohol level results; and (3) semiquantitative field (on-the-spot) breath alcohol screening tests employing portable apparatus or disposable single-test units, yielding only approximate blood alcohol level results.

All breath alcohol analyses depend on the fundamental principle that the distribution of alcohol between circulating pulmonary blood and alveolar air occurs by simple diffusion and, like that of other volatile substances, obeys Henry's law, meaning that distribution equilibrium exists and that consequently for a given temperature a constant ratio exists between the concentrations of alcohol in the blood and in alveolar air. (Henry's law is as follows: The mass of gas dissolved by a given volume of solvent, at constant temperature, is proportional to the pressure of the gas with which it is in equilibrium, whence concentration of gas in liquid phase ÷ concentration of gas in gaseous phase = constant at a definite temperature.)

There is general agreement that the mean value of this Ostwald partition ratio of blood alcohol concentration to alveolar air alcohol concentration at the average temperature of exhaled air (34 C) is approximately 2,100:1; i. e., 2,100 ml. of alveolar air contain the same quantity of alcohol as 1 ml. of blood.[27] The breath alcohol methods determine the quantity of alcohol in a known volume of breath or measure the breath volume required to furnish a known quantity of alcohol, in either case yielding a breath alcohol concentration, generally expressed in milligrams of alcohol per liter of breath. From the blood alcohol–alveolar air alcohol ratio of 2,100:1 and knowledge of the alveolar air content of the analyzed breath sample, the corresponding blood alcohol level is then readily calculated. Alcohol quantitation is accomplished by the same general chemical principles outlined under "Basic Principles of Chemical Tests," above, usually controlled oxidation with iodine pentoxide, potassium dichromate in acid solution, or potassium permanganate in acid solution.

A key element in each breath alcohol method is the procedure employed for determination of the quantity of alveolar air actually analyzed for its alcohol content, the following methods being employed:

1. Alveolar air is collected, as by mechanically trapping the final portion of a prolonged expiration (volume greater than 400 ml.), and analyzed directly.

2. Rebreathed ("venous") air, which is identical in alcohol concentration to alveolar air, is obtained by having the subject rebreathe ordinary expired air four or five times with the nostrils closed and is analyzed directly.

3. Mixed expired air is collected and analyzed for alcohol and carbon dioxide content. The proportion of alveolar air in the sample is estimated from its carbon dioxide concentration on the basis of observations that the alveolar air of normal individuals contains about 5.5% carbon dioxide by volume, while atmospheric air contains only approximately 0.03 vol. % carbon dioxide.

4. Mixed expired air is collected and analyzed for alcohol only. As screening methods for the estimation of the approximate blood alcohol level, some "volumetric" tests assume that ordinary expired breath normally contains about 58 to 63% alveolar air and hence employ an equivalence factor of approximately 3,200 ml. of ordinary mixed expired breath measured at 25 C as containing the same quantity of alcohol as 1 ml. of blood.

Reliability.—Correlation Between Blood Alcohol Levels Obtained by Direct Blood Analysis and from Breath Analysis: The validity of breath alcohol analysis for the determination of the blood alcohol level depends on two components: the analytical reliability of the breath alcohol analysis itself and the constancy to the required extent of the human physiological variables affecting the formulas for conversion of the breath alcohol concentration to blood alcohol concentration. Both factors are tested by examining the closeness with which breath alcohol analyses predict actual blood alcohol levels. Consequently, the correlation between breath analysis–derived blood alcohol levels and those obtained by direct blood analysis has been universally employed as a measure of the reliability of breath alcohol analyses for the indirect determination of blood alcohol concentrations and has been extensively studied.

In evaluating such studies, the physiological and technical variables inherent in blood alcohol analysis as well as those attending breath alcohol analysis must be recognized and considered. Analytically, the blood alcohol methods are subject to considerable variation in reliability, with the chemical accuracy, precision, and specificity of some methods for the determination of blood alcohol being far inferior to those of reliable methods for the determination of breath alcohol. Consequently, the significant reliability characteristics of the referee blood alcohol method must be known and considered in comparing the results of simultaneous blood and breath alcohol analyses. Any substantial difference in collection times of blood and breath specimens should also
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reliable referee blood and urine alcohol methods and models of the Alcometer, Breathalyzer, Drunkometer, and Intoximeter in current production at the time of the respective tests. These recent studies uniformly and conclusively demonstrate that breath alcohol analysis performed by competent operators under expert supervision with properly controlled apparatus, reagents, and procedures can justifiably

for alcohol analysis in body liquids (blood, urine, saliva, etc.) require relatively elaborate laboratory facilities frequently not in operation or otherwise unavailable at the time these problems arise, and they usually require longer to perform than it is practical to wait for decisions based on the analysis results. Geographical inaccessibility of such laboratory facilities or even of personnel qualified to obtain blood specimens is a frequent factor in traffic law enforcement, particularly in county and state highway patrol operations.

To provide on-the-spot alcohol analyses of the required reliability and practicability, a number of rapid field procedures have been developed. In practice, because of the requirements for minimal physical facilities and technical proficiency, such on-the-spot techniques are limited to breath alcohol analysis. These breath alcohol analyses all share the following characteristic advantages:

1. A breath alcohol analysis result, usually expressed in terms of the blood alcohol concentration, is obtained within a few minutes.
2. Breath as the analyzed material accurately reflects the actual blood alcohol level at the time of the test, without lag or overrun, and is often obtainable nearer the time in issue than other materials.
3. When breath obtained at the time of the analysis is used as the specimen, the problem of positively identifying the specimen donor is eliminated, as are most of the collection, identification, preservation, transportation, and evidentiary safeguard problems common to other body materials, together with the need for specially qualified collection personnel, for special collection facilities and containers, and for most of the precautions outlined in detail in the section entitled "Sampling for Laboratory Tests."
4. Since breath analysis eliminates certain difficult steps of the tissue and liquid alcohol analyses, requirements for technical background and skill of the analyst are greatly reduced.
5. Required test facilities can be minimal and are usually limited to the self-contained breath alcohol apparatus used, costs per test after acquisition of the necessary equipment being generally much lower than for comparable laboratory analysis.
6. There is frequently less objection by the tested subject to collection of a breath sample for alcohol analysis than to the body penetration required to obtain a blood specimen, and generally less cooperation and considerably less time are required than for collection of adequate saliva or urine specimens. The embarrassment connected with obtaining a urine specimen under observation is avoided.
7. Multiple, replicate, and serial alcohol determinations at frequent brief intervals are practical, because of the rapidity and relative simplicity of on-the-spot analyses and the rapid nontraumatic sampling of breath specimens, allowing accurate determination of the directional trend of the blood alcohol curve and many experimental analyses on a given subject.

On-the-spot breath analyses also embody a few inherent limitations:

1. Entire breath specimens cannot be effectively preserved for later replicate or independent confirmatory analysis, although the alcohol from a measured volume of breath can be collected and preserved for later analysis.
2. Some cooperation is required from the patient for collection of an adequate breath specimen, the extent varying with the nature of the required breath sample (alveolar air, mixed expired air, or rebreathed air) and the collection apparatus (balloon, sample chamber of apparatus, etc.).
3. Most breath alcohol methods, except, under some conditions, those employing the alcohol–carbon dioxide ratio, are inapplicable to unconscious or completely uncooperative subjects.
4. A period of approximately 10 to 15 minutes after the last ingestion of alcohol (or regurgitation) must elapse before breath alcohol analysis, to insure elimination of the possible effects of any residual mouth alcohol.

These characteristics of the on-the-spot alcohol tests make them highly useful as rapid and simple screening tests to indicate or obviate the need for confirmatory body fluid alcohol determination, such as blood alcohol determination, and to furnish approximate blood alcohol level data. Under prop
controlled conditions, which include proper
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In evaluating such studies, the physiological and technical variables inherent in blood alcohol analysis as well as those attending breath alcohol analysis must be recognized and considered. Analytically, the blood alcohol methods are subject to considerable variation in reliability, with the chemical accuracy, precision, and specificity of some methods for the determination of blood alcohol being far inferior to those of reliable methods for the determination of breath alcohol. Consequently, the significant reliability characteristics of the referee blood alcohol method must be known and considered in comparing the results of simultaneous blood and breath alcohol analyses. Any substantial difference in collection times of the blood and breath specimens should also be considered, particularly in the light of the usual experimental conditions which sometimes preclude complete alcohol distribution equilibrium. These external variables, of course, are absent in correlation studies of the results of simultaneous breath alcohol analyses by different systems or instruments.

Carefully controlled experimental studies of the more commonly employed breath alcohol methods have been conducted recently, employing adequately reliable referee blood and urine alcohol methods and models of the Alcometer, Breathalyzer, Drunkometer, and Intoximeter in current production at the time of the respective tests. These recent studies uniformly and conclusively demonstrate that breath alcohol analysis p [illegible] ly competent operators under expert sup [illegible] h properly controlled apparatus, rea [illegible] dures can justifiably be expected consistently to yield by calculation blood alcohol concentration results within 0.015 weight per cent ethanol of those obtained by direct analysis of blood. The same deviation limits can usually be expected between calculated blood alcohol levels from simultaneous breath analyses by two or more different breath alcohol methods.

Specificity: The specificity of on-the-spot breath alcohol analysis methods is an important consideration, since the nature of most of these tests precludes analytically establishing the absence of interferents; that is, volatile reducing substances which like ethyl alcohol diffuse from the blood into the alveolar air and some of which can reduce the commonly employed oxidizing reagents.

The major reagents employed for alcohol quantitation in breath are iodine pentoxide, potassium dichromate in sulfuric acid solution, and potassium permanganate in sulfuric acid. Of these, iodine pentoxide is the least selective reagent for ethanol, since it readily oxidizes many organic substances, including aldehydes, carbon monoxide, ethyl ether, various hydrocarbons, ketones, and methyl alcohol. Potassium dichromate in acid solution is known to react with aldehydes, ether, methyl alcohol, etc. In general, low concentrations of acetone cause no interference under the reaction conditions employed in breath tests, and food-derived odoriferous flavor substances cause none. Potassium permanganate in approximately 15 *N* sulfuric acid at room temperature, as used in breath alcohol analysis, is probably the test reagent most selective for ethanol, being unaffected by acetone and many volatile food-derived substances in the low concentrations found in breath (citrus fruit oils, cheeses, garlic, onions, etc.), although it reacts with acetaldehyde. Only iodine pentoxide is significantly affected by tobacco smoke, which in practical breath test operation, of course, is totally excluded.

TABLE 3.—*Comparison of Current Major on-the-Spot Breath Alcohol Test Methods*

Apparatus Employed	Method: Developer(s)	Method: Yr. Published	Material Analyzed	Alcohol Equivalent of 1 Ml. of Blood	Reagent Used for Alcohol Quantitation	Test Category	Approximate Cost of Apparatus
Alcometer	*Greenberg and Keator*	*1941*	*Alveolar breath, 12 ml.*	*2,100 ml.*	*Iodine pentoxide*	Quantitative breath analysis	$700 +0.38/test
Alcotest	Grosskopf and Scheibe	1953	Mixed expired breath, 1,000 ml.	3,300 ml. at 34 C	Potassium dichromate in sulfuric acid	Preliminary screening test	$0.75/test
Breathalyzer	Borkenstein	1954	Alveolar breath, 52.5 ml.	2,100 ml.	Potassium dichromate in sulfuric acid	Quantitative breath analysis	$595 +0.60/test
Drunkometer	Harger and co-workers	1938	Mixed expired breath, volume varies	Alcohol-CO_2 ratio: 190 mg. CO_2	Potassium permanganate in sulfuric acid	Quantitative breath analysis	$225 +0.60/test
		1938	Mixed expired breath, volume varies	3,200 ml., CO_2-free, at 25 C	Potassium permanganate in sulfuric acid	Preliminary screening test	Included with above
		1956	Rebreathed air, volume varies	2,100 ml.	Potassium permanganate in sulfuric acid	Quantitative breath analysis	$225 +0.60/test
Drunkotester	Kitagawa and Kobayashi	1953	Mixed expired breath, 100 ml.	3,300 ml. at 25 C	Potassium dichromate in sulfuric acid	Preliminary screening test	$21.50 +0.20/test
Intoximeter	Forrester and co-workers	1941	Mixed expired breath, volume varies	Alcohol-CO_2 ratio: 190 mg. CO_2	Laboratory analysis	Breath collection unit for laboratory quantitative analysis	$4.25 for collecting unit
		1941	Mixed expired breath, volume varies	2,800 ml. at 34 C	Potassium permanganate in sulfuric acid	Preliminary screening test	Included with above

The general alcohol specificity and characteristics of the several reagents are further modified by other variables of the individual breath alcohol methods, such as breath volume analyzed and reaction temperature. Consequently, each breath alcohol method must be evaluated as a whole in regard to its freedom from chemical interference. The entire interference problem is somewhat academic, because in the conditions under which breath tests are employed, predominantly in traffic law enforcement, substances chemically capable of interfering are generally not present in concentrations yielding markedly false apparent alcohol levels. Conversely, the possible presence of food odors, halitosis, and similar conditions will not prevent complete reaction of alcohol with the breath test reagents, nor will masking of beverage odors on the breath, as by chlorophyllin, affect the alcohol content of the breath or the breath alcohol tests.

True reactions with alcohol in expired breath from sources other than the alveolar air (eructation, regurgitation, vomiting) will, of course, vitiate the breath alcohol results but can be detected by observation of the test subject and prevented by the subject's rinsing out his mouth with water.

The rapidity and simplicity of the breath alcohol tests and the individual differences in sensitivity to nonalcohol reducing substances actually lend themselves to a unique application as a semiautomatic qualitative chemical identification system differentiating ethyl alcohol from other reducing substances: Substantially identical alcohol level results (two or more results agreeing within 0.015% w/w) obtained by two different chemical reaction principles (e. g., iodine pentoxide and potassium permanganate oxidations) offer chemical proof of the reducing substance measured being ethyl alcohol, as well as reasonably conclusive evidence of the proper functioning of each test. Presence of a significant concentration of nonalcoholic reducing substance in the breath (with or without presence of ethanol) would affect the different chemical trains in a nonidentical manner and to different degrees and would, therefore, yield quantitatively different apparent "ethyl alcohol" results. For example, presence of much acetone in the breath would cause substantial apparent "alcohol" level results in instruments employing the iodine pentoxide reaction but would not affect breath alcohol methods utilizing potassium permanganate in acid solution.

Calibration and Testing of Apparatus.—The several commercial breath alcohol apparatus either incorporate instrument scales reading directly in blood alcohol concentration or provide calibration tables yielding blood alcohol levels from the observed variables (breath volume analyzed, weight of carbon dioxide absorbed, etc.). The accuracy of blood alcohol concentration predictions by these means can, of course, be checked by direct analysis of a simultaneously obtained blood sample, keeping in mind the referee method limitations.

Simpler methods and apparatus have, however, been developed for calibration and testing of breath alcohol determination instruments, employing mixtures of ethyl alcohol in air or other gases. Careful experimental work has established considerable independently confirmed data on the partition ratio of alcohol between air and water at various temperatures. Using this information, one can easily prepare various known concentrations of alcohol in air by equilibrating air with aqueous alcohol solutions of known concentration. A simple equilibrator consists essentially of a closed metal, glass, or plastic cylinder bearing an air inlet tube terminating in a porous gas-dispersion disk or cylinder, a thermometer, and an air outlet tube connected to a liquid trap. Room air is forced through a 5-cm. layer of alcohol solution by means of an atomizer bulb, in a flow of very small air bubbles, thus attaining complete alcohol distribution equilibrium in one passage; the resulting alcohol concentration of the effluent air is controlled by the concentration of alcohol in the solution and by the temperature.

Analysis of an adequate number of such known air-alcohol mixtures in a breath alcohol apparatus will yield the necessary information for preparation of calibration scales or calibration tables. The original and continuing validity of these or of factory precalibrations can be readily confirmed whenever desired by analysis of one or more air alcohol samples.

EXAMPLE OF CALIBRATION CHECK:

1. The mean alcohol partition ratio constant for the air-water system, $k_{A/W}$, is 0.000217 at 25.0 C. (Ostwald partition ratio coefficient, $k_{A/W}$=weight of alcohol per unit volume of air÷weight of alcohol per unit volume of water.) Hence, 1 liter of air equilibrated at 25 C with water containing 4 mg. of ethanol per milliliter will contain $(1{,}000 \times 4 \times 0.000217) = 0.868$ mg. of alcohol.

2. 2,100 ml. of this air, warmed to 34 C, will contain

$$[2.1 \times \frac{(273+25)^\circ}{(273+34)^\circ} \times 0.868 =]\ 1.769 \text{ mg. of alcohol.}$$

3. A person whose alveolar air contains the same alcohol concentration, 1.769 mg./2,100 ml., will have a blood alcohol level of (1.76 mg./ml.)=0.17% w/v, according to the established blood-alveolar air partition ratio of 2,100:1 at 34 C.

4. Analysis of the above air-alcohol mixture in a breath alcohol apparatus should, therefore, yield the theoretical blood alcohol concentration reading of 0.17% w/v, or (0.17/1.055)=0.16% w/w.

Breath Alcohol Tests

Methods for breath alcohol analysis have been used for many years. The principles and techniques of practical breath alcohol testing as an on-the-spot method will be illustrated by describing briefly in appendix B the components and operation of the six presently commercially available breath alcohol instruments: the Alcometer, the Alcotest, the Breathalyzer, the Drunkometer, the Drunkotester, and the Intoximeter. Some characteristics of each apparatus and of the methods developed for its use are shown in table 3.

Appendix A

LABORATORY PROCEDURES FOR ANALYSIS OF TISSUES AND BODY LIQUIDS FOR ETHYL ALCOHOL

Four methods for the determination of ethyl alcohol in biological materials, all presently well known and widely used in the United States, will be described as exemplifying the many published procedures. Their selection for discussion here does not imply any inferiority of any other procedure. The methods described are equally applicable to tissues, blood, urine, and other body fluids, with some slight modifications for each type of body material. For example, tissues require initial preparation by grinding, blending, or fine comminution to assure homogeneity. Tissue homogenates and blood may be treated by preliminary precipitation of proteins, or they may be distilled directly with the addition of protein precipitants to the distillation flask. The methods described have several common characteristics: all employ distillation for separation of the ethyl alcohol from the specimen; the alcohol in the distillate is quantitated in each by oxidation, using potassium dichromate in sulfuric acid solution below the critical concentration of 20 *N*, the oxidations, in fact, being carried out at less than 18 *N* acidity. Under these conditions, ethyl alcohol in the distillate is quantitatively oxidized to acetic acid and volatile impurities exert minimal interference.

The differences between the methods are in (*a*) the method of distillation, whether by direct distillation or distillation of a deproteinized filtrate; (*b*) the choice of protein precipitants; (*c*) the size, type, and construction of the distillation apparatus; (*d*) the sulfuric acid concentration (ranging from about 17 *N* to 2 *N*) and the potassium dichromate concentration used during the oxidation, with consequent differences in the range of alcohol concentration of the several methods; and (*e*) the measurement of changes in the oxidizing reagent, whether by visual colorimetry, spectrophotometry, or titrimetry. The last represents the most important and distinctive difference between these methods.

Heise Method

The Heise method[7] is as follows:

Principle.—The specimen, commonly blood or urine, is distilled directly from a mixture of picric and tartaric acids to precipitate the proteins and reduce foaming. Varying volumes of distillate in a series of test tubes are made to a constant volume with distilled water. A measured volume of potassium dichromate in sulfuric acid is added and the resulting mixture, at 7 to 8 *N* acidity, is heated in a boiling water bath. The resulting colors are compared visually against a series of 21 color standards prepared with known quantities of ethyl alcohol.

TABLE 4.—*Strong Permanent Standards*

Nominal % Alcohol	Alcohol by Weight	Water, Ml.
0.00	0.00 ml.	1.00
0.00	0.50 ml. of 0.10% by weight	0.50
0.10	1.00 ml. of 0.10% by weight	0.00
0.12	0.60 ml. of 0.20% by weight	0.40
0.14	0.70 ml. of 0.20% by weight	0.30
0.16	0.80 ml. of 0.20% by weight	0.20
0.18	0.90 ml. of 0.20% by weight	0.10
0.20	1.00 ml. of 0.20% by weight	0.00
0.22	0.73 ml. of 0.30% by weight	0.27

Apparatus

1. Distilling apparatus: 500-ml. distilling flask and small condenser. (Equipment and reagents for this procedure are available from LaMotte Chemical Products Co., Towson, Baltimore 4, Md.)
2. Pipets, volumetric.
3. Water bath.

Reagents.—All reagents for this and all following procedures are prepared with analytical reagent grade, chemically pure (C. P.) reagents and distilled water free of reducing substances as shown by suitable purity tests.

1. Oxidizing reagent: 0.33% potassium dichromate in 50% sulfuric acid by volume.
2. Protein precipitants: half-saturated picric acid solution, containing 10% tartaric acid.

Procedure A: Urine Analysis

1. Slowly distill a mixture of 10 ml. of urine and about 10 ml. of picric-tartaric acid protein precipitant from a 500-ml. Florence flask, collecting the first 10 ml. of distillate.
2. Into separate test tubes similar to those used for the standards, place 1 ml. and progressively smaller measured volumes of distillate, making the volume up to 1 ml. in each case with distilled water. Add 3 ml. of the oxidizing reagent to each tube; mix, stopper, and place the tubes in a boiling water bath for four minutes.
3. Cool test tubes and visually compare the resulting colors by transmitted light against the "strong permanent standards" prepared as described in table 4. Divide the nominal alcohol concentration of the matching standard tube by the fraction of 1 ml. of distillate oxidized, to obtain the alcohol percentage of the original urine specimen.
4. If the results are too low to be read, use the weak standards and follow steps 2 and 3 of procedure B below, in which event the alcohol percentage of the original urine specimen=[nominal alcohol concentration of standard ÷ volume of distillate used (milliliters)]×2.

Procedure B: Blood Analysis

1. Add 2 ml. of whole blood to about 15 ml. of the picric-tartaric acid protein precipitant. Distill slowly and collect the first 10 ml. of distillate.
2. Into separate test tubes similar to those used for the standards, place 2 ml. and smaller measured volumes of distillate, making the volume up to 2 ml. in each case with distilled water. Add 1 ml. of the oxidizing reagent to each tube; mix, stopper, and place in a boiling water bath for 12 minutes.
3. Cool the test tubes and visually compare the colors against those of the "weak permanent standards" prepared as described in table 5. Multiply the nominal alcohol concentration of the matching standard tube by [10 ÷ volume of distillate used (milliliters)] to obtain the alcohol percentage of the original blood specimen.

Preparation of Standards

1. Strong Permanent Standards: To each of nine test tubes of uniform diameter add the volumes of alcohol solution and of distilled water indicated in table 4. Add to each tube 3 ml. of oxidizing reagent; stopper the tubes, place in boiling water for four minutes, cool, and seal.
2. Weak Permanent Standards: To each of 12 test tubes of uniform diameter add the volumes of alcohol solution and of distilled water indicated in table 5. Add to each tube 1 ml. of oxidizing reagent; stopper the tubes, place in a boiling bath for 12 minutes, cool, and seal.

Critique.—This is the simplest of the four procedures described, requiring relatively little laboratory space and no special glassware or apparatus. The alcohol recovery of the method as originally described by the author is not as accurate or constant as in the other three methods which follow, chiefly because of the large capacity of the apparatus compared to the small volume of liquid. The distillation is tedious, and much foaming may be encountered with blood samples. The color standard provide steps in color changes (not a continuous series) to which the unknown is approximated. The method thus incorporates both systematic errors and a small, variable, subjective error. Recoveries of 91 to 112% of added alcohol by this method have been reported. A single analysis requires about 20 minutes. Acetone, chloroform, and ether do not interfere in this method.

However, the accuracy and speed of the procedure approaches that of the other methods which will be described, provided the all-glass distillation apparatus and the antifoam agents or precipitants of those methods are used.

Dubowski Method

The Dubowski method [4] is as follows:

Principle.—Specimens of any body fluid (or steam distillates of tissue homogenates) are distilled directly from tungstic acid to precipitate the proteins. An aliquot of the distillate is mixed with a measured volume of standard potassium dichromate in sulfuric acid and the resulting mixture, at 15 *N* acidity, is oxidized at 100 C. The residual potassium dichromate is measured spectrophotometrically at 450-mμ wave length and the corresponding alcohol concentration of the original specimen is obtained from a calibration curve or table prepared from analysis of solutions of known alcohol content.

Apparatus

1. Distilling apparatus: Direct and steam distillation apparatus of Dubowski and Shupe [27] (catalog number SB-1715X, Scientific Glass Apparatus Co., Inc., Bloomfield, N. J.) or distillation apparatus of Harger (see below).
2. Fluid bath: Electric water bath at 100 C or electric constant temperature bath at 100 C, with permanent water-soluble bath fluid (UCON fluid 50-HB-280X, Carbide & Carbon Chemicals Co., 30 E. 42nd St., New York 17, N. Y.).
3. Photometer: Beckman model DU or model B spectrophotometers; Bausch and Lomb Spectronic-20 spectrophotometer; Coleman model 14, 6B, 6C, or 6D spectrophotometers; or filter photometer with microcuvettes and blue filter transmitting in the region of about 450 mμ.
4. Volumetric ware: good grade of pipets and glass-stoppered volumetric flasks.

Reagents

1. Oxidizing reagent: 0.0214 *N* potassium dichromate; 1.0500 Gm. $K_2Cr_2O_7$ in 1 liter of 50 vol. % sulfuric acid. One milliliter of this reagent is equivalent to 0.247 mg. of ethyl alcohol.
2. Sodium tungstate, 10% w/v.
3. Sulfuric acid, 2/3 *N*.
4. Tartaric acid, 10% w/v.

Procedure A for Blood, Urine, Saliva, Cerebrospinal Fluid, Tissue Distillates

1. Place specimen and reagents, as follows, into a 125-ml. distilling flask (a 250-ml. flask in the case of blood): 10 ml. of distilled water (20 ml. for blood analysis only); 2 ml. of the specimen (1-ml. specimens can be analyzed by collecting the distillate in a 5-ml. volumetric flask, proceeding with steps 3 through 5 as usual); 5 ml. of 2/3 *N* sulfuric acid; and 5 ml. of 10% sodium tungstate. Mix the contents by rotation and attach the flask to the distillation apparatus. Begin distillation when the blood has coagulated completely and has changed to a dark brown color.
2. Distill slightly less than 10 ml. directly into a 10-ml. glass-stoppered volumetric flask in about 8 to 10 minutes, using a microburner with a shielded 2.5-to-4-cm. flame. Make the distillate to the 10 ml. mark with distilled water, stopper, and mix thoroughly.
3. Into a 16-by-125-ml. borosilicate glass culture tube with Teflon-lined screw cap, place, in order, 1 ml. of distillate and 5 ml. of oxidizing reagent and mix by vigorous rotation. Immediately close the tube with the screw cap and heat for eight minutes in the 100 C fluid bath, immersing the tube above the liquid level.
4. Cool the tube to room temperature (25 C or less) under running tap water or in an ice bath; mix the contents by rotation, and transfer a portion of the solution into a cuvette. Determine the photometric reading (optical density or per cent of transmittancy) at 450 mμ wave length, after setting the instrument at 100% transmittancy with a reference cuvette containing distilled water.
5. Obtain the alcohol concentration of the unknown specimen, in per cent weight/volume, from a calibration table or curve prepared by subjecting a series of biological specimens of known alcohol content to the entire analysis.

Table 5.—*Weak Permanent Standards*

Nominal % Alcohol	Alcohol by Weight	Water, Ml.
0.000	0.00 ml.	2.00
0.005	1.00 ml of 0.01% by weight	1.00
0.010	2.00 ml. of 0.01% by weight	0.00
0.013	0.52 ml. of 0.05% by weight	1.48
0.016	0.64 ml. of 0.05% by weight	1.36
0.019	0.76 ml. of 0.05% by weight	1.24
0.022	0.88 ml. of 0.05% by weight	1.12
0.025	1.00 ml. of 0.05% by weight	1.00
0.028	1.12 ml. of 0.05% by weight	0.88
0.031	1.24 ml. of 0.05% by weight	0.76
0.034	1.36 ml. of 0.05% by weight	0.64
0.037	1.48 ml. of 0.05% by weight	0.52

Procedure B for Tissues

1. Rapidly liquefy about 10 Gm. of frozen, or ice-cold, tissue in an ice-cold Waring blendor. Weigh out rapidly 2 Gm. of the liquefied sample to the nearest 0.01 Gm. and transfer quantitatively to a

250-ml. distilling flask with 30 ml. of 10% tartaric acid solution. Add 2 to 3 drops of antifoam fluid or use silicone antifoam compound (Dow Corning antifoam AF emulsion 30%, used as a 10% emulsion; Dow Corning antifoam A spray: Dow Corning Corp., Midland, Mich.; antifoam 60 emulsion, General Electric Co., Silicone Products Department, Waterford, N. Y.) or 0.1 Gm. of low-melting paraffin compound. Mix by rotation and attach flask to the steam distillation apparatus.

2. Distill in a rapid current of steam from a generator containing distilled water. Collect about 20 to 30 ml. of distillate in a 125-ml. distilling flask within 8 to 10 minutes.

3. To the 125-ml. distilling flask containing the above steam distillate add, in order, 5 ml. of ⅔ *N* sulfuric acid and 5 ml. of 10% sodium tungstate. Mix by rotation, attach to the distillation apparatus, and proceed as for biological liquids (steps 2-4 of procedure A).

4. Obtain the alcohol concentration of the tissue, expressed in percentage by weight, as in step 5, procedure A, from the same calibration table.

Special Procedures, C

1. Partially decomposed specimens are first distilled from the acid tungstate solution into another 125-ml. distilling flask, to which are then added 10 ml. of saturated aqueous mercuric chloride and 10 ml. of 10% calcium hydroxide suspension. This mixture is then redistilled and the analysis is completed as in procedure A.

2. Submicro and ultramicro determinations are carried out on fresh blood and urine specimens in Conway-type porcelain diffusion cells (catalog numbers 4472-F and 4472-H, Arthur H. Thomas Co., Philadelphia 5, Pa.). For submicroanalysis, 0.10 ml. of whole blood or urine is placed in the outer ring chamber of a 68-mm. diameter Conway unit, together with 1.00 ml. of saturated potassium carbonate to facilitate release of alcohol; 2.50 ml. of potassium dichromate oxidizing reagent is placed in the center well.

For ultramicroanalysis, 0.020 ml. of sample is placed in the outer ring chamber of a 44-mm. diameter Conway unit, together with 0.50 ml. of saturated potassium carbonate; 0.50 ml. of the above potassium dichromate oxidizing reagent is placed in the center well. The cell covers, lubricated with silicone stopcock grease, are applied, and the units are allowed to stand at room temperature of 12 hours, or at 38 C for 2 hours. The contents of the center well are then quantitatively transferred to microvolumetric flasks and made up with distilled water to 5 ml. or 2 ml. in the respective submicro or ultramicro methods. Photometry is carried out in the Beckman model DU spectrophotometer at 450 mμ, using silica microcuvettes whose light path is 10 mm. The alcohol concentration of the original specimen is obtained directly from calibration tables prepared by carrying a series of blood samples of known alcoholic content through complete analyses by the respective methods.

Critique.—The procedure resembles the Heise method; however, the distillation is improved; the test range, sensitivity, and specificity are extended; and the determination of color change after oxidation is made by spectrophotometry. The recovery of alcohol is from 99 to 100%, averaging 99.7%. The mean, deviation between analyses on identical samples by different analysts in separate laboratories is 2.7% of the alcohol actually present (a mean absolute difference of ± 0.004% w/v ethyl alcohol). Alcohol-free blood and urine specimens consistently yield "blank" values less than 0.001% w/v alcohol; and acetone, chloral hydrate, chloroform, ethyl ether, lactic acid, and methenamine do not interfere in this analysis, although methanol and high concentrations of formaldehyde and of paraldehyde do react. The range of the method for a single analysis on unknown specimens is 0 to 0.61% w/v ethyl alcohol; however, higher alcohol concentrations in the original sample do not require a complete repeat analysis, since they can be determined by appropriate dilution of the remaining initial distillate. A single determination requires about 20 minutes. Up to five analyses per hour can be performed in series using a single distillation apparatus, and a single analyst can perform 8 to 12 determinations per hour by using two distillation units.

Harger Method

The Harger method[28] is as follows:

Principle.—Protein-free filtrates of blood, spinal fluid and tissues, and diluted urine are distilled from an all-glass still of small capacity. Alcohol in the distillate is oxidized to acetic acid by an accurately measured quantity of potassium dichromate in sulfuric acid at about 17 *N* acidity. The excess dichromate is accurately titrated with a standard solution of ferrous sulfate in the presence of methyl orange. The difference between this titration and that of a "blank" distillate containing no alcohol represents the quantity of dichromate used in the oxidation.

Apparatus

1. Distilling apparatus: 250-ml. round-bottom Pyrex flask and condenser of small capacity with straight glass condensing tube. The flask and condenser are connected, preferably, with standard taper ground-glass connections.

2. Volumetric flasks and pipettes: 5-ml. microburet graduated in 0.01 ml.

3. Beads or fragments of glass or Vitreosil to prevent bumping.

4. Reaction tubes: Pyrex test tubes, 25 by 200 mm., or 50-ml. Erlenmeyer flasks.

Reagents

1. Sodium tungstate, 10% w/v.
2. Sulfuric acid, 1/12 *N*.

3. Sulfuric acid, approximately 17 *N*: Pour, slowly with stirring, one volume of concentrated sulfuric acid into one volume of water; cool.

4. Sulfuric acid, concentrated.

5. Methyl orange, 0.1%: Dissolve 1 Gm. of methyl orange in 1 liter of approximately 0.025 *N* NaOH solution.

6. Ferrous sulfate solution: Place 50 Gm. of $FeSO_4 \cdot 7H_2O$, weighed to 0.1 Gm., in a 250-ml. volumetric flask containing 150 ml. of water. Carefully add 30 ml. of concentrated sulfuric acid; cool and dilute to the mark with water. Stopper and protect from light.

7. Ferrous sulfate–methyl orange standard solution: Into a 125-ml. Erlenmeyer flask, place 70 ml. of 17 *N* sulfuric acid, 30 ml. of 0.1% methyl orange solution, and exactly 2 ml. of ferrous sulfate solution. Two and one-half milliliters of this solution is equivalent to about 1 ml. of 0.0434 *N* dichromate. Standardize the solution each day. Keep the solution cool and prepare fresh solution after three or four days.

8. Standard potassium dichromate, 0.0434 *N*: Transfer 2.129 Gm. of C. P. potassium dichromate to a 1-liter volumetric flask. Dissolve in water and dilute to 1 liter. One milliliter of this solution is equivalent to 0.5 mg. of ethyl alcohol.

Procedure

1. Prepare the usual 1:10 protein-free tungstic acid filtrate, using 2 ml. or more of blood or spinal fluid, or 2 Gm. or more of minced tissue. For example, to 5 ml. of blood add 40 ml. of 1/12 *N* sulfuric acid, followed by 5 ml. of 10% sodium tungstate solution. Mix. Let stand a sufficient time, with occasional mixing, to allow complete diffusion of alcohol throughout the flask. Filter. Dilute urine tenfold with water. The alcohol in tissues is preferably removed by steam distillation.

2. Pipet 10 ml. of blood filtrate or diluted urine (representing 1 ml. of sample) into a 250-ml. flask. Add 40 ml. of water and a few glass beads or fragments. Connect the flask with the condenser and carefully heat the contents with a microburner flame. Collect almost 50 ml. of distillate through a condenser outlet which dips nearly to the middle of a 50 ml. glass-stoppered cylinder or volumetric flask. Dilute to the 50 ml. mark. Mix.

3. Pipet 10 ml. of the diluted distillate (representing 0.2 ml. or 0.2 Gm. of sample) into a 50-ml. Erlenmeyer flask or 25-by-200-mm. test tube. Add exactly 2 ml. of 0.0434 *N* dichromate solution and then 10 ml. of concentrated sulfuric acid. Mix well; cover with small beaker and allow to stand exactly 10 minutes. Cool in a bath of cold running water.

4. Simultaneously prepare several reagent blanks by substituting 10 ml. of distilled water for 10 ml. of distillate in step 3, using 1 ml. (titration B_1) and 2 ml. (titration B_2) of 0.0434 *N* dichromate.

5. Titrate the excess of dichromate with the ferrous sulfate–methyl orange reagent (in a microburet). The yellow color fades as the chromate ion is reduced. Then, when the first excess drop of reducing solution is added, the pink color of methyl orange fills the solution and makes a sharp end-point.

6. If the sample titration in step 5 is less than 0.2 ml., *repeat the distillation using* 5 *ml. of protein-*free filtrate or oxidize less than 5 ml. of original distillate by substituting distilled water for an appropriate portion of the distillate.

7. Standardize the procedure against specimens and aqueous solutions of known alcohol content.

Calculations.—Let B_1 and B_2=the blank titrations of 1 and 2 ml., respectively, of 0.0434 *N* dichromate (step 4), and let U=the sample titration (step 3). Further, let S=milliliters or grams of sample represented by the sample titration. Then, B_2-B_1=milliliters of ferrous sulfate solution equivalent to 1 ml. of the 0.0434 *N* dichromate. The difference between blank titrations is determined in order to correct for impurities in the water and reagents and for the extra drop to obtain the end-point. Hence $(B_2-U) \div (B_2-B_1)$=milliliter of 0.0434 dichromate required for the oxidation of alcohol. Since 1 ml. of the dichromate is equivalent to 0.5 mg. of ethanol,

$$\% \text{ alcohol in original sample} = \frac{0.5\ (B_2-U).}{10S\ (B_2-B_1)}$$

Critique.—This is perhaps the most widely used laboratory method. It requires simple and inexpensive apparatus. The distillation equipment permits rapid boiling and efficient recovery. The salient feature of the method is the final titration which has a sharp and distinctive end-point. The titration procedure is used in several other methods described in the literature. The range of concentrations of alcohol is up to 0.50% w/v; the speed of determinations and the recovery, specificity, and precision are within the same limits as those of the Dubowski procedure A described above.

Friedemann and Brook Method

The Friedemann and Brook method[10] is as follows:

Principle.—Blood, urine, or tissues are distilled directly or with steam from an acid–sodium tungstate–mercuric sulfate medium (removing volatile amines and some aldehydes, paraldehyde, and ketones). The distillate is redistilled from calcium hydroxide and mercuric sulfate (removing most phenols and the remaining aldehydes and ketones). The alcohols in the distillate are oxidized to the respective acids (formic, acetic, etc.) with potassium dichromate and sulfuric acid at about 2 *N* acidity. The volatile acids are quantitatively distilled from saturated magnesium sulfate solution. A portion of the distillate is titrated directly with standard sodium hydroxide; another portion is titrated after extraction with a measured volume of organic solvent, from which the distribution coefficient may be calculated. The two titrations identify and determine ethyl alcohol and higher alcohols. Methyl alcohol is determined quantitatively by titration of formic acid.

Apparatus

1. Distillation apparatus: All-glass, for direct and steam distillation similar to that used in the Dubowski and Harger methods. (Obtainable from Aloe Scientific Division, A. S. Aloe Co., 5655 Kingsbury Ave., St. Louis 12, Mo.)
2. Soda lime tower: Glass tube, 3 by 48 in., filled with soda lime between cotton plugs, used for aeration of distillates with carbon dioxide–free air.
3. Separatory funnel: Squibb separatory funnel, Pyrex glass, 250 ml. glass-stoppered.
4. Volumetric ware: Good grade of pipets, burets, and glass-stoppered volumetric flasks.

Reagents

1. Calcium hydroxide suspension: Slake 100 Gm. of pure calcium oxide with a minimum of water; add 1 liter of water. Keep the creamy suspension in a glass-stoppered bottle protected from dust.
2. Distilled water, free of volatile impurities.
3. Ethyl ether, anhydrous.
4. Magnesium sulfate.
5. Mercuric oxide, red powder.
6. Mercuric sulfate reagent, 10% w/v in 2 *N* sulfuric acid.
7. Potassium dichromate, powdered.
8. Sodium hydroxide, 0.10 *N* stock solution, protected from atmospheric carbon dioxide.
9. Sodium hydroxide, 0.010 *N*, freshly prepared from the 0.10 *N* stock solution with boiled, distilled water.
10. Sodium tungstate solution 10% w/v.
11. Sulfuric acid, 20 *N*.
12. Sulfuric acid, 10 *N*.

Procedure

1. Into a 500-ml. distillation flask containing 100 ml. of distilled water and 15 ml. of acid mercuric sulfate reagent, place 1 to 10 ml. of blood or urine (or 1 to 10 Gm. of finely ground tissue), 10 ml. of sodium tungstate solution, and some talcum. Mix contents thoroughly by rotation.

2. Distill rapidly until the volume has been reduced about one-half or more, collecting the distillate 1 in another 500-ml. distillation flask.

3. Add to this distillate 1, 10 ml. of acid mercuric sulfate reagent, 10 ml. of calcium hydroxide suspension, talcum, and enough distilled water to bring the volume to about 100 ml. If the sample contains paraldehyde, phenol, or other volatile substances than alcohols, the contents of the first and second distillation flasks should be well shaken and allowed to stand for at least 10 minutes before each distillation.

4. Distill the mixture, receiving 70 to 80 ml. of distillate 2 in a glass-stoppered 100-ml. volumetric flask. Add 10 ml. of 20 *N* sulfuric acid and an excess of powdered or dissolved potassium dichromate. Allow the well-mixed reaction mixture (which contains about 2 *N* acid) to stand overnight at room temperature, or heat for about 30 minutes in a boiling water bath and then cool.

5. Transfer the oxidation mixture to a 500-ml. distillation flask; add distilled water to bring the mixture volume to about 200 ml. Then add about 50 gm. of magnesium sulfate crystals and talcum. The magnesium sulfate reduces the acidity, prevents overoxidation when the volume becomes small, and greatly increases the volatility of the acetic and other acids. Distill the mixture and collect 180 to 190 ml. of distillate 3 in a 500-ml. distillation flask.

6. Aerate the distillate 3 with air from the soda lime tower to remove carbon dioxide and titrate the total volatile acids to the phenolphthalein endpoint with 0.01 *N* sodium hydroxide (titration A). (Aqueous sodium phenolphthaleinate is preferred to the alcoholic indicator solution.)

7. If the presence of methyl alcohol or other alcohols is suspected, treat the distillate 3, after titration A, with talcum, 2 ml. of 10 *N* sulfuric acid, 50 Gm. of magnesium sulfate, and 0.3 to 0.5 Gm. of mercuric oxide in that order; and redistill in 30 to 45 minutes, collecting the distillate 4 in a 250-ml. volumetric flask which is then made to the mark with distilled water. This quantitatively removes formic acid, which is produced in a constant 60% yield from methyl alcohol.

8. Titrate directly 100 ml. of distillate 4 with 0.01 *N* sodium hydroxide after aeration to remove carbon dioxide (titration B).

9. Extract another 100 ml. of distillate 4 with 50 ml. of ethyl ether in a 250-ml. Squibb separatory funnel, shaking for one minute or more. Draw off the aqueous phase and titrate it with 0.01 *N* sodium hydroxide (titration C).

10. The procedure may be considerably simplified, if it is known that only ethyl alcohol is present, by doing only two distillations and one titration, as follows, according to steps 1, 2, and 4 through 6: (*a*) distillation of alcohol from mercuric sulfate–tungstic acid, (*b*) distillation of volatile acids following oxidation, and (*c*) titration of total volatile acids by titration A.

11. In all sample titrations (A, B, and C) corrections for acids, if any, derived from reagents are made by titrations of blank distillates.

12. The procedure is standardized against aqueous solutions and blood containing known quantities of ethyl alcohol or other alcohols.

Calculation of Results.—The difference between titrations A and B determines the formic acid from oxidation of any methyl alcohol present. Titration B determines the volatile acids derived by oxidation from alcohols other than methyl alcohol. Titrations B and C determine the distribution constant $k=(C/B\times 100)$, which is characteristic for the acid derived from each alcohol and which represents the percentage of acid remaining in the aqueous phase. Thus the constant for acetic acid from ethyl alcohol, or the percentage of acid not extracted=86.5; for acids from propyl alcohol=70.0; for acids from butyl alcohol=49.0.

When titration A equals titration B, the sample contains no methyl alcohol. If, in addition, k is 86 to 87, the sample contains only ethyl alcohol.

Critique.—The distinctive feature of this method is the ability to identify and determine specifically ethyl alcohol and other alcohols which may be present in the sample. Most potential interferents are eliminated in the double distillation. With 2-ml. samples the minimum alcohol concentration at which the method is still reliable is about 0.050 ± 0.0015% ethyl alcohol or methyl alcohol and with 5-ml. samples about 0.020 ± 0.0006% (steps 1 through 6). The over-all recovery is within 99% in the four distillations of the complete procedure. The accurate range of the method is very wide, from 0.02 to about 1.0% of alcohol in the sample. The complete procedure is longer and more involved than the three previously described methods. A single determination requires about three hours. However, if the determination is limited to only two distillations and one titration (step 10), about 90 minutes are required for a determination.

QUALITATIVE TESTS FOR SOME COMMON INTERFERING SUBSTANCES

The identity and significant concentrations of possible chemical interferents vary with the particular method chosen for the determination of ethyl alcohol, depending on the relative specificity or selectivity of that method for ethyl alcohol. When present, such interference consists of the production of falsely positive apparent ethanol reactions, or of false elevations of a true ethanol level. The presence of significant concentrations of any potential chemical interferents, in body materials obtained from living subjects, is a comparatively infrequent occurrence, particularly when the subjects are conscious and well. It is even more unusual to find significant levels of two or more potential chemical interferents in a single biological material specimen from a living subject, in addition to ethyl alcohol. However, it is frequently necessary or desirable in forensic alcohol determinations to establish experimentally the absence of such potential interferents in significant concentrations in order to safeguard their probative value; and it is occasionally useful to search for the more common nonethanol volatile organic substances in clinical alcohol analyses conducted in connection with the differential diagnosis of coma states.

Among the volatile substances most commonly encountered in actual or suspected interference with some alcohol determination methods, when present in sufficient quantity, are acetaldehyde, acetone, formaldehyde, isopropyl alcohol, methyl alcohol, and paraldehyde. The following simple tests will generally suffice for indicating the presence or absence in body material specimens of concentrations of these six substances potentially capable of interference in some, though not all, ethyl alcohol determination methods. These screening tests are not intended to cover every substance potentially capable of chemical interference in some alcohol analysis, nor is inclusion of a test for a given substance an indication that it can or will interfere in any particular ethanol determination method.

Obviously, if these or other tests disclose the presence of significant levels of potentially interfering substances in a specimen to be analyzed for ethyl alcohol content, the possibility of such interference should be eliminated by choosing a method unaffected by the interferent(s) present or by adequately modifying the proposed alcohol procedure. Should this be impossible or impractical, or should the specimen appear unsuitable for alcohol analysis because of advanced decomposition, putrefaction, or especially great chemical contamination, it is generally preferable to forego that alcohol analysis rather than to jeopardize the validity of the results.

An important application of these screening tests is in clinical alcohol analysis practice under the following two conditions: (1) in the event of lack of concordance between a confirmed ethyl alcohol analysis result and the subject's physical condition, and (2) in comatose or seriously intoxicated subjects, to avoid a false sense of security based on, and a misleading clinical interpretation given to, a positive ethyl alcohol analysis result, in the presence of another unrecognized concurrent intoxication (e. g., by methyl alcohol).

Acetaldehyde Test

Acetaldehyde is detectable in biological materials and distillates by its distinctive pungent odor at concentrations below 0.01%, as is paraldehyde, which is hydrolyzed during distillation and appears in the distillate as acetaldehyde. The following chemical screening test identifies acetaldehyde in significant concentrations.

Reagents

1. Acetic acid, glacial, C. P.
2. Piperidine (hexahydropyridine).
3. Sodium nitroferricyanide, saturated solution, freshly prepared.

Procedure

1. To 1 ml. of unoxidized body material distillate in a small borosilicate glass test tube, add 1 drop of freshly prepared sodium nitroferricyanide solu-

tion to give a pale yellow color to the solution; then allow 1 drop of piperidine to flow down the side of the inclined tube. Shake the tube to mix the contents, and observe the resulting solution color.

2. Add 3 to 4 drops of glacial acetic acid; mix by shaking and observe for color changes.

Test Interpretation

Negative: A yellow to light brown color is obtained in step 1, which changes to a slightly lighter shade of yellow on addition of glacial acetic acid. (Formaldehyde does not react in this test.)

Positive: A green to deep blue color, depending on the concentration of acetaldehyde, is obtained within two minutes in step 1; it changes to deep green on addition of glacial acetic acid and then fades.

Sensitivity.—The test becomes positive at acetaldehyde concentrations of 0.005% or higher in the distillate.

Acetone Test

Acetone is readily detectable in body material distillates at concentrations considerably below those interfering in most alcohol determination methods, by use of commercial urine acetone test materials based on Rothera's test.

Reagent.—Acetest reagent tablets, containing aminoacetic acid, disodium phosphate, and sodium nitroferricyanide (catalog number 2381, Ames Co., Inc., Elkhart, Ind.).

Procedure

1. Place 1 Acetest reagent tablet on a clean piece of white paper. Place 1 drop of distillate on the tablet.

2. Observe the tablet for color changes after 30 seconds.

Test Interpretation

Negative: Tablet color remains unchanged or tablet becomes pale cream colored.

Positive: Tablet surface changes within 30 seconds to a color varying from light lavender to deep purple, depending on the acetone concentration present.

Sensitivity.—The test becomes positive at acetone concentrations below 0.01% in the distillate.

Formaldehyde Test

Formaldehyde is readily detectable in biological material distillates by a sharp recognizable odor even at low concentrations (below 0.02%) and is demonstrable by simple specific chemical tests at far lower levels.

Reagents

1. Chromotropic acid disodium salt: 4,5-dihydroxy-2,7-naphthalene-disulfonic acid disodium salt, Practical (catalog number P230, Distillation Products Industries Division, Eastman Kodak Co., Rochester 3, N. Y.).

2. Sulfuric acid, concentrated, C. P.

Procedure

1. To 1 ml. of biological material distillate in a small borosilicate glass test tube, add approximately 10 mg. of chromotropic acid disodium salt and mix thoroughly by shaking.

2. Add 1.5 ml. of concentrated sulfuric acid along the side of the inclined test tube so as to underlay the aqueous solution. Examine the interface for a purple or violet color.

3. Cautiously mix the tube contents by gentle swirling, and allow the tube to stand for approximately five minutes. Examine for presence of a diffuse purple or violet color.

Test Interpretation

Negative: Colorless or yellow color at the interface (step 2) and a colorless or yellow mixture (step 3). (Acetaldehyde does not react in this test.)

Positive: Presence of a purple or violet color at the interface (step 2) and a purple or violet color in the mixture (step 3).

Sensitivity.—The test becomes positive at formaldehyde concentrations below 0.00005% in the distillate.

Isopropyl Alcohol Test

Isopropyl alcohol can be identified in acetone-free body material distillates by a simple modification of Denigès' procedure,[3b] sensitive to concentrations below interfering levels.

Reagent.—Denigès' reagent: Suspend 2 Gm. of yellow mercuric oxide in 16 ml. of distilled water and, while mixing, add 8 ml. of concentrated sulfuric acid. Stir and dissolve with addition of another 16 ml. of distilled water.

Procedure

1. To 1 ml. of distillate in a small borosilicate glass test tube add 2 ml. of Denigès' reagent. Stopper the test tube and heat in a fluid bath at 100 C for 30 minutes.

2. Cool the tube and examine for presence of a white finely divided precipitate, centrifuging the tube if necessary.

Test Interpretation

Negative: No white precipitate or white turbidity is present.

Positive: A distinct white precipitate is present. (Acetone also yields a positive test and is ruled out by the acetone test described above.)

Sensitivity.—The test becomes positive at isopropanol concentrations of 0.005% in the distillate.

Methyl Alcohol Test

Methyl alcohol, which interferes in most ethyl alcohol determination methods, can be identified readily and, in the absence of formaldehyde, specifically at extremely low concentrations in biological material distillates by a simple modification of Eegriwe's chromotropic acid test for formaldehyde.

Reagents

1. Acid permanganate reagent: 3.0% potassium permanganate in 12.8% phosphoric acid (15 ml. of 85% syrupy phosphoric acid per 100 ml.).

2. Chromotropic acid disodium salt: 4,5-dihydroxy-2,7-naphthalene-disulfonic acid disodium salt, Practical.

3. Sodium bisulfite ($NaHSO_3$), C. P., powdered.

4. Sulfuric acid, concentrated, C. P.

Procedure

1. Into a small borosilicate glass test tube place 1 ml. of biological material distillate; add 0.1 ml. (approximately 2 drops) of acid permanganate reagent, shake well to mix, and allow to stand at room temperature for two minutes.

2. Add just enough powdered sodium bisulfite to decolorize completely the excess potassium permanganate and any brown manganese dioxide formed (approximately 5 to 10 mg.).

3. Add approximately 10 mg. of chromotropic acid disodium salt and shake gently to dissolve; then add 1.5 ml. of concentrated sulfuric acid, allowing the acid to flow down the side of the inclined test tube to form a separate layer below the aqueous solution. Examine the interface for presence of a purple or violet color.

4. Cautiously mix the tube contents by gentle swirling and allow the tube to stand for approximately five minutes. Examine for presence of a diffuse purple or violet color.

5. In all positive methyl alcohol tests, also test the unoxidized distillate for formaldehyde as described above.

Test Interpretation

Negative: Absence of a purple or violet color at the interface (step 3) or of a diffuse purple or violet color (step 4) indicates the absence of methyl alcohol and of formaldehyde. (The solution may be colorless or yellow to light brown.)

Positive: Presence of a purple or violet color at the interface (step 3) or of a diffuse purple or violet color (step 4) indicates the presence of methyl alcohol or of formaldehyde in the distillate, the color intensity being proportional to the concentration. (The presence of formaldehyde in the distillate can be ruled out by the formaldehyde test described above; i. e., by a negative result following steps 3 and 4 of this test performed on 1 ml. of unoxidized distillate.)

Sensitivity.—The test as described becomes positive at methanol concentrations of less than 0.0002% in the distillate.

Appendix B

PROCEDURES FOR ANALYSIS OF BREATH FOR ETHYL ALCOHOL

Alcometer

The Alcometer (originally called Alcoholometer) (fig. 1), developed by Greenberg and Keator,[9] is a fully automatic apparatus (manufacturer: Frederick G. Keyes, Inc., 243 Broadway, Cambridge, Mass.), based on use of the iodine pentoxide reaction of Haggard and Greenberg,[3] in which the cycle of events is controlled by a synchronous electric motor.

The major components of the analytical train are as follows (fig. 2): (1) a pump supplying room air to purge the instrument and to sweep the sample through the analytical system; (2) a silica gel drying tube no. 1 for drying incoming room air; (3) an iodine pentoxide reaction tube no. 1 to oxidize any interfering substances in the incoming room air; (4) a bulb, containing powdered copper, to absorb any liberated iodine; (5) a drying tube no. 2 to insure complete dryness of the purified room air; (6) a fixed volume sample chamber, with solenoid valves; (7) an iodine pentoxide tube no. 2 to oxidize any alcohol present in the breath sample; (8) a glass or plastic bubbler tube leading from the second reaction tube into the indicator solution; (9) an indicator solution vial containing starch–potassium iodine to react with any iodine released in the iodine pentoxide oxidation in tube no. 2; and (10) a photronic colorimeter consisting of two barrier layer photocells, a photometer lamp, and a microammeter calibrated directly in blood alcohol concentration.

In addition to the Alcometer, the following expendable materials are required for each test: one indicator vial containing 0.1% starch and potassium iodine solution in a vial which also serves as a photometer cuvette and one wood mouthpiece.

The analysis consists of four principal phases: (1) purging of the sample chamber and chemical train with purified room air; (2) collection of a measured volume of alveolar air; (3) pumping of the breath sample through the hot iodine pentoxide reagent bed and flushing of any liberated proportionate quantity of iodine vapor into the 0.1% starch indicator solution; and (4) measurement of the resulting blue color of the indicator solution with an integral photoelectric colorimeter, on which a reading, proportionate to the alcohol concentration of the breath sample, is obtained on a microammeter scale, calibrated directly in blood alcohol concentration.

Alcohol is oxidized as follows by the iodine pentoxide:

(*a*) $5C_2H_5OH + 6I_2O_5 = 10CO_2 + 15H_2O + 6I_2$

(*b*) $C_2H_5OH + I_2O_5 = 2CO_2 + H_2O + 2HI$

At a constant temperature and a constant rate of air flow, the yield of iodine is consistently proportional to the quantity of ethyl alcohol oxidized.

Various mechanical and electrical components operate the instrument through the proper sequence of steps according to predetermined timing; interlocks prevent untimely operation or omission or duplication of steps in the analysis. The initial warm-up of the instrument requires about 10 minutes, and a complete analysis thereafter requires about 8 minutes.

Alcotest

This portable device (fig. 3), developed by Grosskopf and Scheibe,[21] utilizes the vapor-in-air detector tube system of Grosskopf and employs potassium dichromate in sulfuric acid for oxidation of alcohol in mixed expired breath (manufacturer: Drägerwerk, Lübeck, Germany; U. S. distributor: Schueler and Company, 75 Cliff St., New York 38, N. Y.).

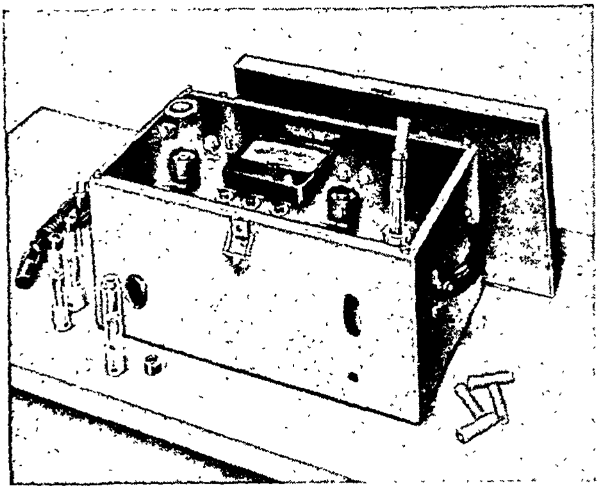

Fig. 1.—The Alcometer, model M-4.

A single test unit consists of an expendable sealed glass detector tube, an expendable plastic mouthpiece, and a sturdy plastic breath-measuring bag of 1 liter capacity. The detector tube is a 9.5-mm. diameter glass tube, 85 mm. long, containing a 15-mm. long reagent layer of silica gel impregnated with potassium dichromate in sulfuric acid solution held between glass wool plugs. A 1-mm. wide annular marking of yellow color approximating that of the reagent zone before the test encircles the tube in the middle of the reaction layer. Alcohol is oxidized as follows:

$$2K_2Cr_2O_7\ (\text{yellow}) + 8H_2SO_4 + 3C_2H_5OH = 2Cr_2(SO_4)_3\ (\text{green}) + 2K_2SO_4 + 3CH_3COOH + 11H_2O$$

The reaction is accompanied by a color change from the yellow of the potassium dichromate to the green of the chromic sulfate, the width of the green zone being roughly proportional to the breath alcohol concentration. The approximate lower sensitivity of the original test is at about 0.08 mg. of alcohol per liter of tested air (corresponding in this test system to about 0.03% w/v blood alcohol), and the maximum recognizable upper test range is at about 0.5 mg. of alcohol per liter (corresponding to about 0.17% w/v blood alcohol). In accordance with the suggestions of one of us (K. M. D.), a special Alcotest 1.5 unit was later developed for United States practice.

The flow resistance of the tube (1 liter per minute at 35 to 55 mm. H_2O pressure) is such that in actual use 1 liter of expired breath is generally forced through in about 15 seconds, requiring the test subject's full lung pressure and preventing aspiration and admixture of room air. The absorbed water vapor from the breath reacts with the concentrated sulfuric acid in the reagent layer to produce a temperature of about 80 C, which increases the speed of the reaction and heats the glass reaction tube sufficiently to prevent condensation of breath prior to its passage through the reagent zone.

The test operation consists of three steps: 1. Both ends of the detector tube are cut off. A plastic mouthpiece is placed on one end, and the other end is inserted (in the direction indicated by an arrow on the tube) into the plastic air inlet of the completely deflated plastic bag for collecting and measuring 1 liter of air. 2. The 1-liter test bag is inflated by the subject with mixed expired breath through the mouthpiece and detector tube, if possible with a single breath, in not more than 20 seconds. 3. The reaction zone of the detector tube is examined to determine whether any discoloration of the originally yellow reagent layer to green has occurred, and if so its extent.

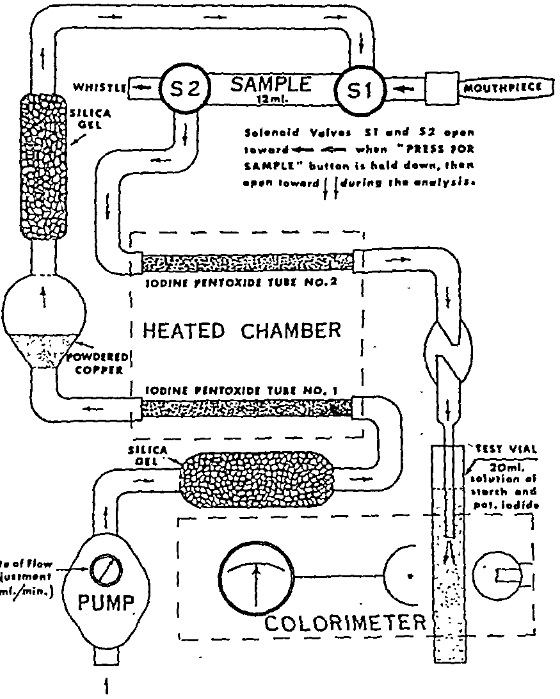
WHISTLE
S2
SAMPLE
12ml.
S1
MOUTHPIECE
SILICA GEL
Solenoid Valves S1 and S2 open toward ← ← when "PRESS FOR SAMPLE" button is held down, then open toward ↓↓ during the analysis.
IODINE PENTOXIDE TUBE NO. 2
HEATED CHAMBER
POWDERED COPPER
IODINE PENTOXIDE TUBE NO. 1
SILICA GEL
TEST VIAL
20ml. solution of starch and pot. iodide
Rate of Flow Adjustment (50 ml./min.)
PUMP
COLORIMETER

Fig. 2.—Schematic diagram of the Alcometer.

Rough semiquantitative interpretation of any color change noted in the Alcotest 1.5 detector tube can be made as follows: At no discernible green discoloration the probable blood alcohol level of the test subject is less than 0.05% w/v. A green coloration of the reaction zone up to the yellow marking ring (about 8 mm.) indicates a probable blood alcohol level of 0.05 to 0.15% w/v. A green coloration of the reaction zone beyond the yellow comparison ring indicates that the probable blood alcohol level of the test subject is above 0.15% w/v.

A complete test requires about one minute. The test materials are packaged in a small cardboard carton containing 10 detector tubes, 10 cellophane-wrapped sterilized plastic mouthpieces, an ampul-tip breaker, and one plastic breath-measuring bag, together with a direction booklet and a color comparison chart. The shelf life of the unit is stated to be at least two years.

The Alcotest is designed only for use as a preliminary breath alcohol screening test.

Breathalyzer

The Breathalyzer (fig. 4) (distributor: Stephenson Corporation, Red Bank, N. J.) was developed by Borkenstein[25] and utilizes potassium dichromate in sulfuric acid solution as the reagent for oxidizing alcohol in alveolar air. The operation consists of four principal phases (fig. 5): (1) flushing of the apparatus with room air; (2) collecting a measured volume of alveolar air; (3) passing the breath sample through potassium dichromate–sulfuric acid solution in an ampul-cuvette and allowing oxidation to proceed; and (4) measuring the resulting color change of the reagent with an integral photoelectric filter photometer. The increased light transmission through the test ampul, resulting from the color change from the yellow of the dichromate to the green of the chromic sulfate, is measured with a balanced electrical circuit from two photovoltaic cells, using the Bunsen principle. A light bulb is mounted on a movable carriage between the ampuls, and the distance the light must be moved to reestablish the original photometric balance between light transmission through the ampuls prior to analysis is registered by the movement of a coupled pointer across a scale calibrated directly in blood alcohol concentration.

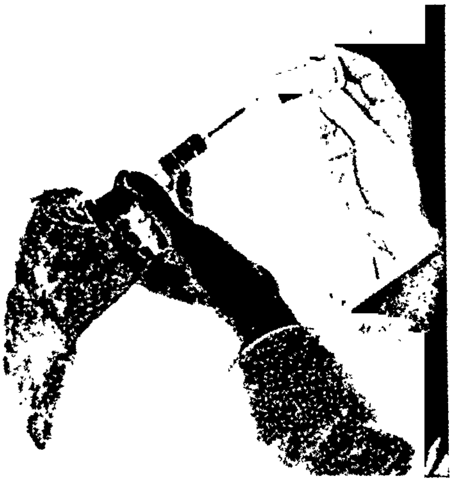

Fig. 3.—The Alcotest unit.

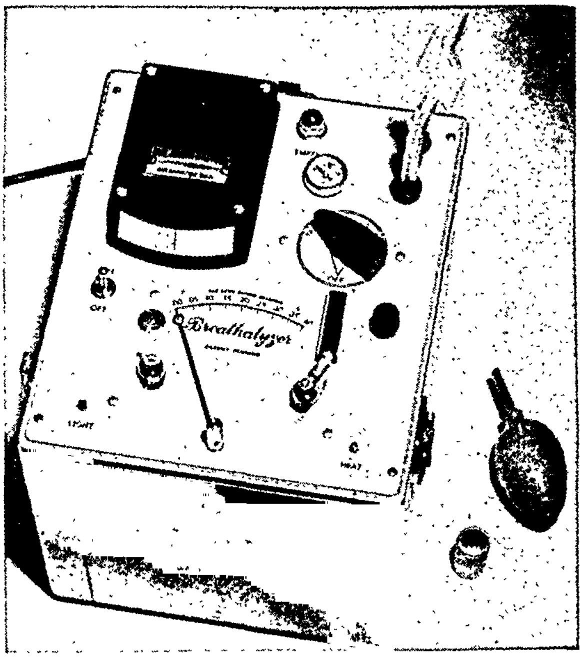

Fig. 4.—The Breathalyzer.

In addition to the Breathalyzer apparatus in its self-contained aluminum carrying case, the following expendable materials are required for each test: (1) two Breathalyzer reagent ampuls containing 3.0 ml. of 0.025% potassium dichromate in 50 vol.% sulfuric acid (one ampul serves as a photometric standard and is reusable; the ampuls also serve as photometer cuvettes), (2) one glass capillary bubbler tube for delivering the breath sample into the reagent ampul, and (3) a plastic mouthpiece and saliva trap.

A complete analysis requires about 6 minutes, and the initial warm-up of the instrument requires about 20 minutes. The Breathalyzer is designed for quantitative breath alcohol determination.

Drunkometer

The Drunkometer (fig. 6) (distributor: Stephenson Corporation, Red Bank, N. J.), developed by Harger and associates,[8] is a portable apparatus which also incorporates provisions for performing a rapid semiquantitative breath alcohol screening test. Potassium permanganate in sulfuric acid solution is used to quantitate the alcohol from samples of mixed expired breath or rebreathed air.

The apparatus consists of the following main components (fig. 7): (1) a rubber balloon for collection of the breath sample; (2) the alcohol reaction unit, consisting of an ampul containing sulfuric acid and potassium permanganate, connected to the balloon through a glass capillary tube and mounted in front of an electrically illuminated window between two color comparison standards in similar ampuls; (3) a breath-quantity measuring system consisting of a two-way valve, a water displacement gasometer, and an alternate chemical train of a moisture-absorbing tube of Dehydrite (an anhydrous granular magnesium perchlorate, supplied by Arthur H. Thomas Co., Philadelphia 5, Pa.) and a carbon dioxide–absorbing tube of Ascarite (a sodium hydroxide asbestos absorbent, supplied by Arthur H. Thomas Co., Philadelphia 5, Pa.).

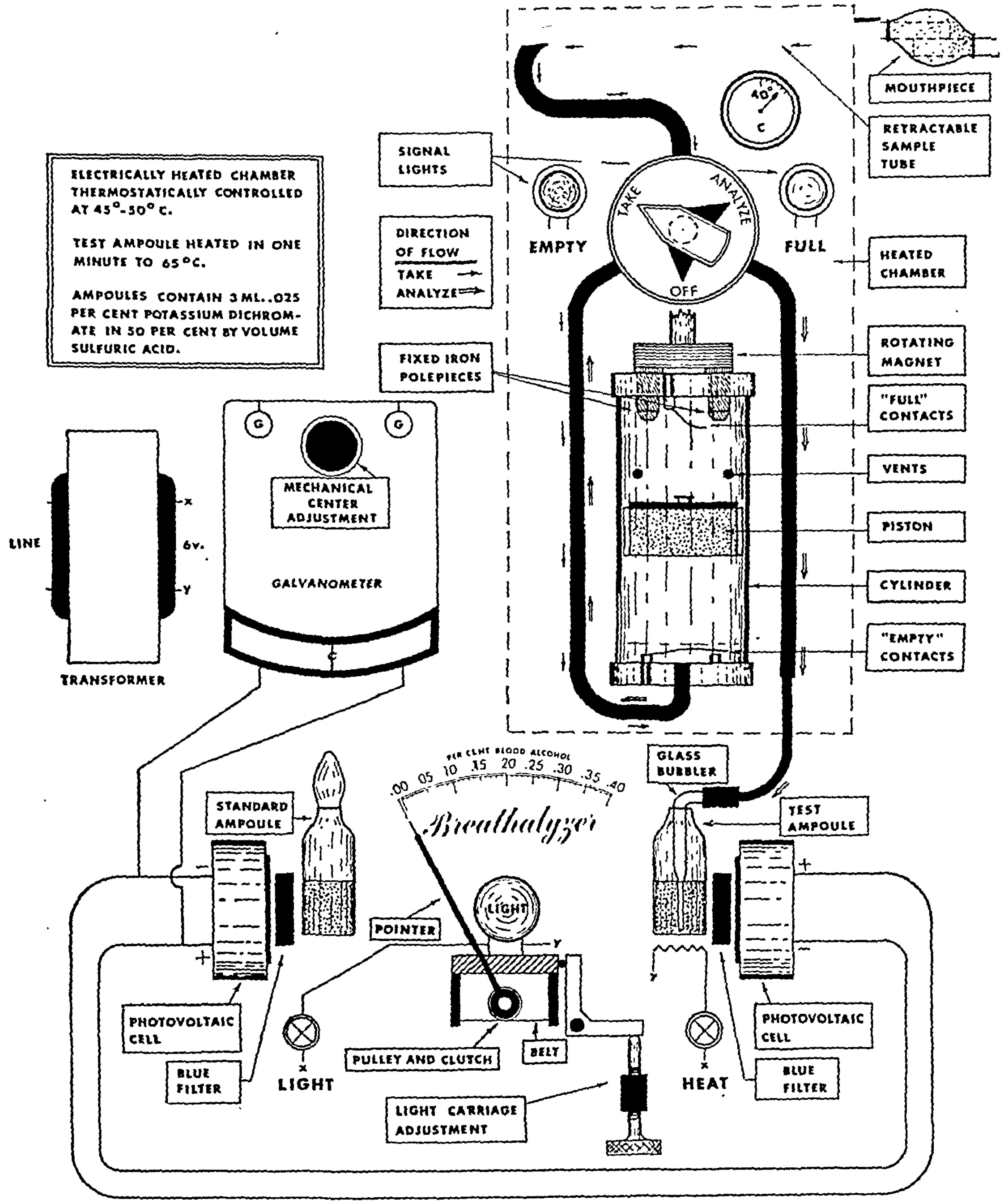

Fig. 5.—Schematic diagram of the Breathalyzer.

In addition to the self-contained apparatus, the following expendable materials are required for each test: (1) a rubber balloon with wood mouthpiece; (2) a sealed glass ampul reaction tube containing 10 ml. of 16 N sulfuric acid, to which 1.0 ml. of $N/20$ potassium permanganate solution is added immediately prior to an analysis; and (3) a 4-mm. glass inlet bubbler tube with rubber sleeve for making gas-tight connections between the ampul, the breath inlet tube, and the gasometer.

The Drunkometer can be used as a preliminary rapid semiquantitative screening test employing mixed expired breath or for quantitative determinations employing mixed expired breath or rebreathed air. In each instance, a fixed quantity of ethyl alcohol (0.169 mg.) is measured and the volume of mixed expired breath or rebreathed air required to furnish this quantity of alcohol is determined by direct water displacement, or the volume of alveolar air is calculated from the weight of carbon dioxide absorbed.

The analysis consists of the following major phases: (1) collection of a suitable breath sample by inflation of a rubber balloon with mixed expired breath or rebreathed air; (2) passage of the sample through the alcohol reagent in the ampul reaction tube until the original purple permanganate color has reached a pink-yellow end-point intermediate between the pink and yellow color standards, or until about 2,000 ml. of breath have passed through the apparatus (indicating a probable blood alcohol level of not more than 0.03%); (3) measurement of the breath volume required to reach the end-point (and which, therefore, contained 0.169 mg. of ethanol) by one of the following procedures: 1. Semiquantitative ("volumetric") test using mixed expired breath and quantitative determination using rebreathed air: The breath after leaving the reaction ampul passes directly to the graduated gasometer, where it displaces an equal volume of water. The breath volume used is read directly from the gasometer. 2. Quantitative determination using mixed expired breath: The breath after leaving the reaction ampul passes through the Dehydrite and through the previously weighed Ascarite tube, which absorbs the carbon dioxide present and is later reweighed to determine the carbon dioxide quantity absorbed during the test.

Calculations.—Since in all three variations of the tests (table 3), the quantity of alcohol required to reach the end-point (0.169 mg.) is identical, only the breath volume used for each test needs to be determined to supply the basic information concerning breath alcohol concentration. This is, in turn, converted to blood alcohol concentration using the observations that the weight of alcohol present in 1 ml. of blood is equal (*a*) to that present in about 3,200 ml. of mixed expired breath after removal of carbon dioxide and collection over water at 25 C or (*b*) to that present in 2,100 ml. of alveolar breath or in 2,100 ml. of rebreathed air or (*c*) to that accompanying 190 mg. of carbon dioxide from mixed expired breath or from alveolar breath. A complete "volumetric" Drunkometer test requires about 5 to 8 minutes; the complete quantitative determination requires about 10 minutes, including time for weighing the Ascarite tube before and after the test.

Drunkotester

The portable Drunkotester (manufacturer: Komyo Chemical Industrial Co., Ltd., Meguro, Tokyo, Japan; distributor: Kongo Shoji Kaisha, Ltd., Central P. O. Box No. 1253, Tokyo, Japan), developed by Kobayashi and Kitagawa, utilizes potassium dichromate in sulfuric acid solution to oxidize the alcohol in mixed expired breath.

The equipment consists of an expendable rubber balloon, an expendable sealed glass alcohol detector tube, a metal piston pump with two-way valve measuring 50 ml. per piston stroke, and a comparison chart—all contained in a small metal carrying case. The detector tube is a 4-mm.-diameter glass capillary tube, 12 cm. long, containing five narrow reagent zones of silica gel impregnated with potassium dichromate in sulfuric acid solution which are separated by 1 cm. long layers of powdered glass.

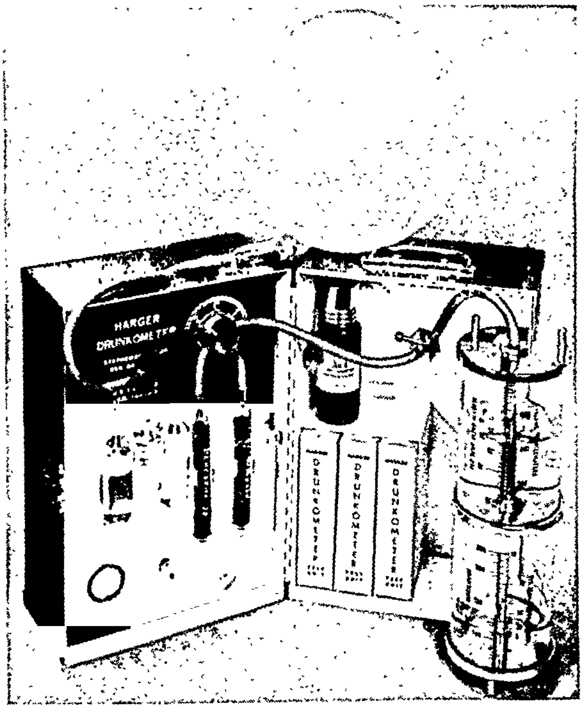

Fig. 6.—The Drunkometer.

In the operation, the ends of the glass detector tube are cut off and a rubber balloon is inflated by the subject with mixed expired breath. One end of the detector tube is inserted into the rubber balloon outlet, the other into the pump inlet opening. The pump valve is opened and 50 ml. of breath are aspirated from the ballon through the detector tube in approximately 15 seconds. The pump valve is then reversed; the piston is returned to the initial position; the valve is reopened, and another 50-ml. breath sample is aspirated through the detector tube. The tube is then disconnected and warmed briefly over an open flame (burner, match, cigarette lighter, etc.). The number of reagent zones which have changed from their original yellow color are noted by comparison with an unused tube, and the color intensity of the several changed zones (various shades of orange, green-yellow, and blue-green) is compared with a color chart depicting 12 tubes in various stages of change corresponding to blood alcohol levels of 0.00 to 0.42% in steps of 0.03 or 0.04%. A complete test requires about three to five minutes.

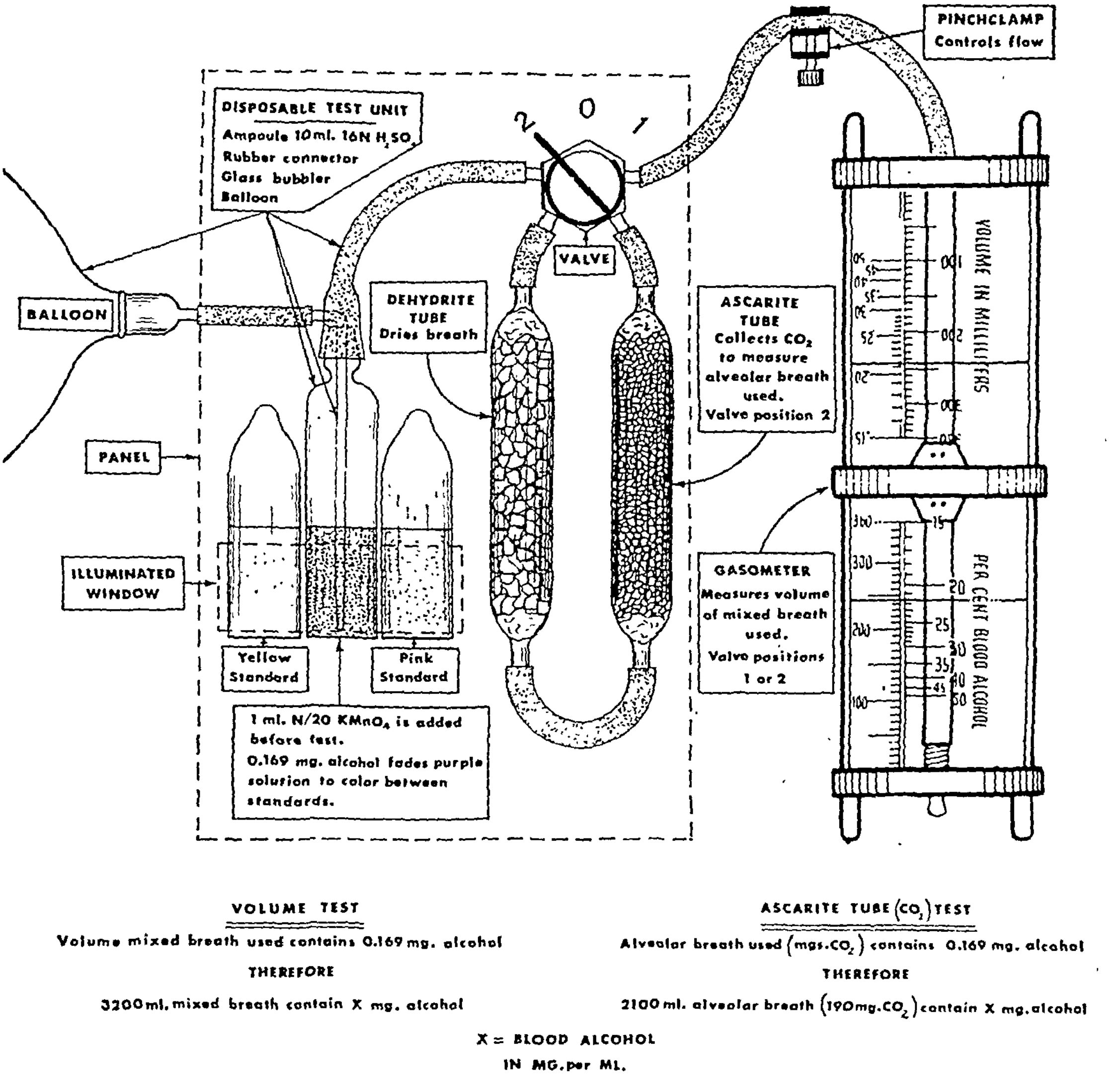
PINCHCLAMP
Controls flow
DISPOSABLE TEST UNIT
Ampoule 10ml. 16N H_2SO_4
Rubber connector
Glass bubbler
Balloon
2
0
1
VALVE
BALLOON
DEHYDRITE TUBE
Dries breath
ASCARITE TUBE
Collects CO_2 to measure alveolar breath used.
Valve position 2
VOLUME IN MILLILITERS
PANEL
ILLUMINATED WINDOW
GASOMETER
Measures volume of mixed breath used.
Valve positions 1 or 2
PER CENT BLOOD ALCOHOL
Yellow Standard
Pink Standard
1 ml. N/20 $KMnO_4$ is added before test.
0.169 mg. alcohol fades purple solution to color between standards.
VOLUME TEST
Volume mixed breath used contains 0.169 mg. alcohol
THEREFORE
3200 ml. mixed breath contain X mg. alcohol
ASCARITE TUBE (CO_2) TEST
Alveolar breath used (mgs. CO_2) contains 0.169 mg. alcohol
THEREFORE
2100 ml. alveolar breath (190 mg. CO_2) contain X mg. alcohol
X = BLOOD ALCOHOL IN MG. per ML.

Fig. 7.—Schematic diagram of the Drunkometer.

The system is restricted to use as a preliminary breath alcohol screening test.

Intoximeter

The Intoximeter (fig. 8) (manufacturer: Intoximeter Association, 334 Buffalo Ave., Niagara Falls, N. Y.), developed by Jetter, Moore, and Forrester,[26] is a portable device for quantitatively absorbing both alcohol and carbon dioxide from exhaled breath which may be obtained in the field and later analyzed in the laboratory, combined with an integral system for performing a preliminary on-the-spot breath alcohol screening test.

The breath collection system is based on the organic vapor-absorbing properties of magnesium perchlorate. In principle, the method depends on the complete absorption of alcohol and of water vapor from a mixed expired breath sample by magnesium perchlorate, followed by the quantitative absorption of carbon dioxide by Ascarite.

Each unit is usable for a single test and can be recharged with chemicals for reuse. The main components of the Intoximeter are as follows (fig. 9): (1) a rubber balloon for initial collection and temporary storage of the breath sample; (2) a field test unit used as a screening test and consisting of a glass tube containing a fritted glass disk charged with sulfuric acid and potassium permanganate, connected to the balloon; and (3) a quantitative test unit, consisting of a train of two tubes, containing respectively magnesium perchlorate and Ascarite.

The operations in the field consist of three steps: (1) collection of a sample of mixed expired breath by inflation of the rubber balloon; (2) passage of a small portion of the collected breath through the field test unit containing an acid potassium permanganate solution (a portion of any alcohol present in the breath reacts with the acid permanganate, destroying its original purple color in a time interval roughly inversely proportional to the breath alcohol [and therefore the blood alcohol] concentration); (3) successive passage of the remaining sample through the magnesium perchlorate tube and the preweighed Ascarite tube for later quantitative laboratory analysis. (The former tube quantitatively absorbs any alcohol and all water vapor present in the breath; the latter quantitatively absorbs the carbon dioxide.)

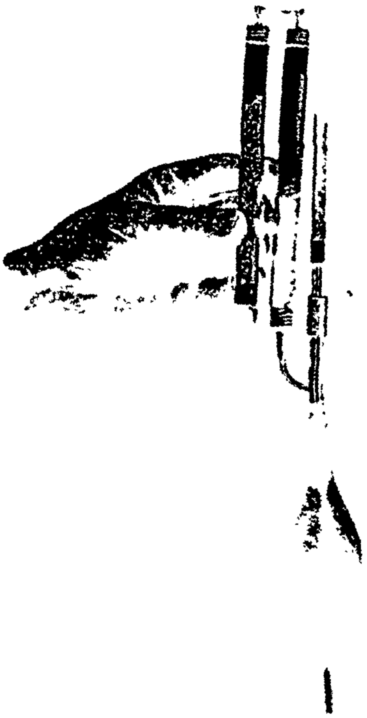

Fig. 8.—The Intoximeter.

After these initial steps the entire Intoximeter is returned to a suitably equipped laboratory, where the quantity of absorbed alcohol is distilled and determined by the Harger[5] or other suitable laboratory test and the Ascarite tube is reweighed, yielding the weight of carbon dioxide from the increase in weight over that before the test. From the analysis of alcohol and carbon dioxide, the blood alcohol concentration is calculated on the basis of the observation that the weight of alcohol present in 1 ml. of blood is equal to that accompanying 190 mg. of carbon dioxide in the mixed expired or alveolar breath.

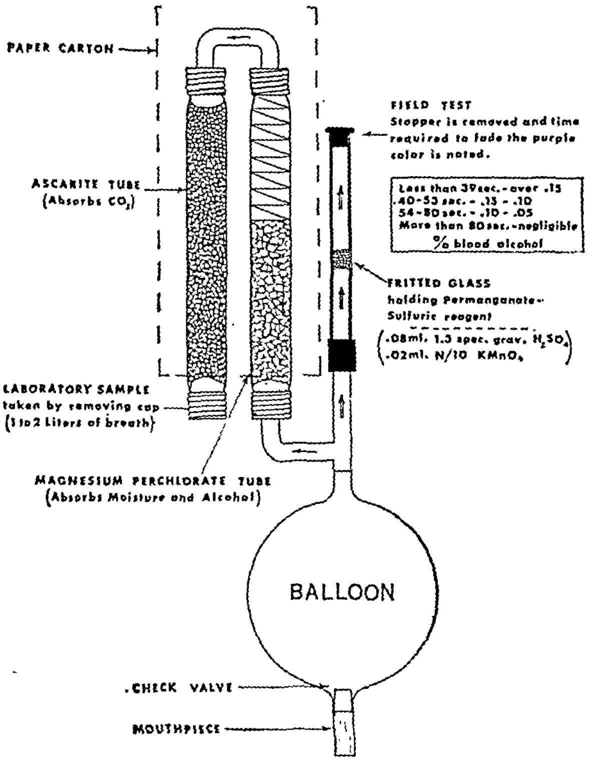
PAPER CARTON
FIELD TEST
Stopper is removed and time required to fade the purple color is noted.
Less than 39sec.- over .15
.40-53 sec. - .15 - .10
54-80 sec. - .10 - .05
More than 80sec.-negligible
% blood alcohol
ASCARITE TUBE (Absorbs CO_2)
FRITTED GLASS holding Permanganate-Sulfuric reagent
(.08ml. 1.3 spec. grav. H_2SO_4
.02ml. N/10 $KMnO_4$)
LABORATORY SAMPLE taken by removing cap (1 to 2 Liters of breath)
MAGNESIUM PERCHLORATE TUBE (Absorbs Moisture and Alcohol)
BALLOON
CHECK VALVE
MOUTHPIECE

Fig. 9.—Schematic diagram of the Intoximeter.

Performance of the on-the-spot field test and breath collection usually requires about five minutes.

The Intoximeter Association has announced the development of a "photoelectric intoximeter" which is stated to employ an alveolar air sample and potassium dichromate in sulfuric acid solution as the oxidizing reagent for quantitative breath alcohol analysis and to incorporate provisions for the simultaneous collection of a second alveolar air sample for subsequent confirmatory laboratory analysis.

The bibliographic references have been omitted from THE JOURNAL and will be supplied, on request, by the Committee on Medicolegal Problems, 353 N. Dearborn St., Chicago 10.

The illustrations are used through the courtesy of the following persons or organizations: figure 1, Frederick G. Keyes, Inc.; figures 2, 4, 5, 7, and 9, Prof. R. F. Borkenstein, Indiana University; figure 3, Schueler and Co.; figure 6, the Stephenson Corporation; and figure 8, the Intoximeter Association.

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THE HUMANITIES IN MEDICINE

GUEST EDITORIAL

Amos R. Koontz, M.D.

THE physician has long been looked on as a special sort of person in our society. The best of the profession have always been leaders in their communities. The repute in which the physician has been held was eloquently stated in Robert Louis Stevenson's tribute to him: "He is the flower of our civilization, and when that stage of man is done with, only to be marveled at in history, he will be thought to have shared but little in the defects of the period and to have most notably exhibited the virtues of the race."

For generations the best of our physicians have been educated not only in the science of their times but also in the humanities. However, there was a time when some of our medical schools were "proprietary schools," which did not require even a grammar school education as a prerequisite to study medicine. About 50 years ago that deplorable situation changed as a result of the well-known Flexner report and the American Medical Association's simple device of classifying schools as A, B, and C schools. Many schools which could not stand the publicity of their lower classifications went out of existence, thus reducing the number by more than half. We now have standard minimal entrance requirements, and the general educational average of the entering student is far superior to what it had ever been before this change was made.

In spite of the better education offered today the comment is often heard that the medical manuscripts are dull and boresome in comparison to those of 50 years ago. Few physicians today write as Osler did. Welch's lectures were erudite and Lewellys F. Barker was gifted with a flow of English such as few people have attained. Other examples could be cited. What has caused the difference?

In some of our select medical societies, one hears prominent men use poor English and pronunciation so bad that the listener is distracted from the content of the paper. There are probably two reasons for this.

First, our secondary education has deteriorated, except in the best private schools and the exceptional public school. Superintendents of public instruction and school boards have required teachers to take courses (mostly repetitious) in education, *in order to become "qualified" and to be advanced.* The stress has been on method instead of content. Not only are some of these courses useless but they hinder the acquisition of a real education in such fundamentals as mathematics, history, the languages, and science. This trend has been carried over into our colleges, where, with the number of "snap" elective courses offered, it is possible to graduate and still be an ignoramus. This is not the fault of our youth but of the type of educational processes to which they are exposed.

Young persons who are going to study medicine must have a more serious outlook on educational problems than the average student. But many youngsters do not decide to study medicine until they are well along in college and often not until they are through. If they have not taken the solid courses and skipped the froth along the way, they will not be prepared for medicine.

About the time of World War I, "premedical" courses were instituted, to insure that those who were to study medicine would be properly grounded in the fundamental sciences they would need to understand the medical sciences. As time went on and competition for entrance to medical schools became keen, these courses "backfired," resulting in the average student entering medical school with a far more limited fundamental education than a physician should have. As medical schools stressed science in entrance requirements, the premedical student loaded up on science and often completely neglected the humanities. Some medical schools now (belatedly) are concerned about this and deplore that their entering students have not a well-rounded education. If physicians are to take the social and cultural positions in their communities which is the ideal of our profession, every one who is to study medicine should be liberally educated in both the sciences and the humanities. Once this is accomplished, medical schools need not worry about the fundamental education of the students whom they select for admission, and the medical public need not worry about the diction of speakers at medical meetings or the lucidity of papers in medical journals.

In the meantime, we have on our hands a whole generation of physicians who entered medical school qualified in science but not in the humanities. Must such physicians sit and bemoan their fate? Certainly not. By properly selected reading, they can still broaden their education. But when is a practitioner, busy with patients, staff meetings, committee meetings, the medical literature, medical meetings, and writing papers, to have time for outside reading. The answer is utilization of scraps of time. There should always be nonmedical reading material on the bedside table. A few minutes to half an hour may be utilized before the lamp is turned off. A good book should be at hand when one is waiting for trains and planes and every overnight bag should contain one. And don't waste time looking out the window—grab a book. The more comprehensive a man's education, the better physician he will be. He is thereby given more of the human touch.

"In no profession does culture count for so much as in medicine, and no man needs it more than the general practitioner, working among all sorts and conditions of men, many of whom are influenced quite as much by his general ability, which they can appreciate, as by his learning of which they have no measure. The wider and freer a man's general education the better practitioner he is likely to be, particularly among the higher classes to whom the reassurance and sympathy of a cultivated gentleman of the type of Eryximachus, may mean much more than pills and potions." Osler said that.

CARDIAC RESUSCITATION IN MYOCARDIAL INFARCTION

Sudden death may occur in the early stage of acute myocardial infarction as a result of either ventricular standstill or ventricular fibrillation. A few such patients with recent myocardial infarction have been saved, where quick and heroic action together with fortunate circumstances were responsible for resuscitation with cardiac massage during the critical four-minute period.[1] It would seem that the time has come when a greater number of deaths from ventricular fibrillation or standstill could be prevented by planned readiness for such emergency resuscitation of patients admitted to the hospital with a diagnosis of recent myocardial infarction. Fortunately, in some patients with acute or impending myocardial infarction a warning develops in the form of bouts of premature beats or advanced atrioventricular block before the fatal change in cardiac mechanism sets in. Consideration should be given to placing patients in the acute stage of myocardial infarction routinely under continuous electrocardiographic observation with a monitoring system for excessive slowing or acceleration of the ventricular action; thus it might be possible both to recognize in time the patient who is in immediate danger of developing a fatal disturbance of cardiac rhythm and to foresee whether he is threatened by ventricular standstill or ventricular fibrillation. New methods for the treatment of the former have become available. An external pacemaker for electric stimulation of the heart[2] has been used successfully under such circumstances[3] and may now be replaced by the newly developed transistor pacemaker with percutaneous insertion of a myocardial electrode.[4] It is to be expected that a similar device, which would eliminate the need for thoracotomy, will be perfected for defibrillation of the ventricles, although rhythmic manual compression ("massage") may still be necessary in certain cases to restore and maintain pumping action until resumption of spontaneous coordinated heart action.

1. Nickel, S. N., and Gale, H. H.: Altered Prognosis with Cardiac Massage: Cardiac Resuscitation in Acute Myocardial Infarction—Report of Two Successfully Treated Cases, J. A. M. A. **170**:23-27 (May 2) 1959.
2. Zoll, P. M.: Resuscitation of Heart in Ventricular Standstill by External Electric Stimulation, New England J. Med. **247**:768-771 (Nov. 13) 1952.
3. Solarz, S. D.; Berkson, D. M.; and Pick, A.: Asystole Complicating Acute Myocardial Infarction, J. A. M. A. **168**:2124-2127 (Dec. 20) 1958.
4. Thevenet, A.; Hodges, P. C.; and Lillehei, C. W.: Use of Myocardial Electrode Inserted Percutaneously for Control of Complete Atrioventricular Block by Artificial Pacemaker, Dis. Chest **34**:621-631 (Dec.) 1958.

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COUNCIL ON NATIONAL DEFENSE

ARMY MEDICAL SERVICE PRESENTS MASS CASUALTY CARE CONCEPTS AND TECHNIQUES

The seventh annual National Civil Defense Conference will be held in Atlantic City on Saturday, June 6, immediately prior to the opening of the annual American Medical Association convention. "The one-day program will highlight medical problems involved in nuclear warfare," said Dr. Harold C. Lueth. "The program . . . will dramatize the important fact that the medical and health professions can take positive action to minimize the impact of mass casualties if properly trained and organized." Dr. Louis M. Orr will open the conference. Physicians attending the meeting will get a one-day version of the Army's one-week education and training program dealing with mass casualty concepts and treatment techniques.

The general methods of instruction for these courses include lectures, student participation, group and panel discussions, visual aids, and manikin demonstrations. Currently, the courses are being given at Walter Reed Army Medical Center in Washington, D. C., and Brooke Army Medical Center in San Antonio, Texas. The courses embrace both the short-term and long-term expected injuries. Counter medical and health measures are stressed to combat the nuclear effects of blast, burn, and radiation injuries, both from the preventive and curative standpoint. All information pertaining to registration may be obtained from Frank W. Barton, Secretary, Council on National Defense, American Medical Association, 535 N. Dearborn St., Chicago 10.

Morning

8:00-9:00	Registration
9:00-9:05	**Call to Order and Introductory Remarks** Harold C. Lueth, M.D., Chairman, Committee on Disaster Medical Care, Council on National Defense, A. M. A.; Member, Council on National Defense, A. M. A., Evanston, Ill.
9:05-9:15	**Welcome Address on Behalf of A. M. A.** Louis M. Orr, M.D., President-Elect, A. M. A., Orlando, Fla.
9:15-9:25	**Introduction to Army Medical Service Course on Management of Mass Casualties** The Surgeon General, Department of the Army.
9:25-9:40	**Graphic Presentation of Situation**
9:40-10:10	**Casualty Estimation and Analysis** Major Jack C. Fitzpatrick, MC, USA, Nuclear Medical Officer, Office of the Assistant for Nuclear Warfare, Instruction and Casualty Studies, Army Medical Service School, Brooke Army Medical Center, Fort Sam Houston, Texas.
10:10-10:45	**Casualty Demonstration** Lieut. Col. Vincent I. Hack, MSC, USA, Army Medical Service School, Brooke Army Medical Center, Fort Sam Houston, Texas.
10:45-11:00	BREAK
11:00-11:20	**First Aid: Survival Care** Lieut. Col. Joseph D. Goldstein, MC, USA, Chief, Department of Atomic Casualties Studies, Walter Reed Army Institute of Research, Washington, D. C.
11:20-11:30	**Discussion of Emergency Medical Packet for 100 Casualties** Col. Theodore M. Carow, MC, USA, Chief, Supply Division, Office of the Surgeon General, Department of the Army, Washington, D. C.
11:30-12:00	**Sorting and Establishment of Priorities** Lieut. Col. H. Haskell Ziperman, MC, USA, Director, Department of Military Medicine and Surgery, Army Medical Service School, Brooke Army Medical Center, Fort Sam Houston, Texas.

Afternoon

12:00-12:30	**Management of Burns Resulting from Nuclear Disaster** Lieut. Col. Edward H. Vogel, MC, USA, Commanding Officer, Surgical Research Unit, Brooke Army Medical Center, Fort Sam Houston, Texas.
12:30-1:00	**Management of Soft Tissue Trauma** Lieut. Col. William H. Moncrief Jr., MC, USA, Director, Division of Surgery, Walter Reed Army Institute of Research, Washington, D. C.
1:00-2:15	LUNCH
2:15-2:45	**Preventive Medicine in Disaster: Public Health Aspects** Col. Philip R. Beckjord, MC, USA, Assistant Chief, Preventive Medicine Division, Office of the Surgeon General, Department of the Army, Washington, D. C.
2:45-3:15	**Chemical and Biological Warfare** Col. William D. Tigertt, MC, USA, Commanding Officer, United States Army Medical Unit, Fort Detrick, Md.
3:15-3:30	BREAK
3:30-3:45	**Impact of Radioactive Fall-out on Medical Operations** Col. Roy D. Maxwell, MSC, USA, Assistant for Nuclear Warfare Instruction and Casualty Studies, Army Medical Service School, Brooke Army Medical Center, Fort Sam Houston, Texas.
3:45-4:15	**Psychological Aspects of Disaster** Col. Albert J. Glass, MC, USA, Chief Psychiatry and Neurology Consultant, Office of the Surgeon General, Department of the Army, Washington, D. C.
4:15-5:00	**Panel Discussion—Question Period**

MEDICAL NEWS

ALASKA

Rise in Radioactivity.—During the first six weeks of 1959 air sampling stations at Juneau, Anchorage, and Fairbanks all measured radioactivity, which rose to about 10 micromicrocuries per cubic meter of air according to reports received by March 1 at the Alaska Department of Health radiological office in Juneau. When the first monitoring station of Alaska's radiation surveillance network went into operation at Juneau in May, 1956, the background radioactivity was measured at 0.15 to 0.25 micromicrocurie per cubic meter of air. The highs recorded in Juneau between Jan. 1 and Feb. 17, were 11.4 on Jan. 5, 5.9 on Jan. 26, and 9.3 on Feb. 9. In Anchorage the reading on Jan. 16 was 7.6, after which it went up to 8.7 on Jan. 23 and 9.2 on Jan. 26. In Fairbanks the highest reading for the period was 10.5 on Jan. 26. The readings are the USPHS Washington laboratory results obtained from 24-hour air samples made in Alaska by using 4-inch dust filters and indicating beta activity in comparison with a 0.02 microcurie radioactive strontium standard.

CALIFORNIA

Program for Teaching and Research.—Under a $255,000 grant from the Russell Sage Foundation, Stanford Medical School will establish a new teaching and research program that combines social sciences with medicine. Students and faculty of the Medical School and of the departments of sociology, psychology, and anthropology will collaborate. The program will begin next fall when the medical school moves into its new 20-million-dollar center on the campus. The Russell Sage grant will provide basic support for the first five years. It will finance a beginning staff, student fellowships, and research. Nurses, social workers, and other members of the health team are expected to join the program eventually. Plans were developed from studies supported by an earlier grant from the foundation. The planners included Associate Dean Lyman M. Stowe of the Medical School, and professors Rodney R. Beard, of preventive medicine, Thomas A. Gonda, of psychiatry, and Edmund H. Volkart, Ph.D., of sociology. Professor Volkart will direct the program during its first year. It will emphasize interdepartmental teaching and research and will supplement health teaching and research along current lines.

ILLINOIS

Chicago

Annual I. F. Volini Lectureship.—This lectureship, presented annually under the auspices of the Phi Sigma of Phi Chi, of which fraternity Dr. Volini was a member, was given April 6 by Dr. Edward Compere, Northwestern University Medical School, on "The Stimulation or Retardation of Bone Growth."

English Anatomist to Lecture.—The 1959 Solomon Theron De Lee Lecture will be given by Prof. Sir Solly Zuckerman, C.B., F.R.S., department of anatomy, The Medical School, The University of Birmingham, England, on "The Control of the Gonadotrophic Functions of the Pituitary" in Dora De Lee Hall, The Chicago Lying-In Hospital, University of Chicago, 5841 Maryland Ave., Thursday, May 7, 4:30 p. m.

University News.—Dr. Andre Michel Lwoff, French authority on microbiology, presented a medical lecture at the University of Chicago entitled "Factors Influencing the Evolution of Viral Diseases at the Cellular Level in the Organism," sponsored by the E. R. Squibb and Sons Centennial Lecture Program. Dr. Lwoff has been with the Pasteur Institute, Paris, since 1921 and has been head of the department of microbial physiology since 1938.

Dr. Hasegawa to Receive Fellowship.—Dr. Junji Hasegawa has been named to receive the 1959 Gillette-Toni Fellowship for dermatologic study at the Northwestern University Medical School. This is the second straight year Dr. Hasegawa has been honored with this award by the fellowship committee at Northwestern. He will conduct research in dermatology under the direction of Dr. Herbert Rattner, chairman of the school's dermatology department. The fellowship grant totals $4,000, of which $2,500 is paid to Dr. Hasegawa with an additional $1,500 given to the university to defray tuition and departmental overhead expenses.

Break Ground for Diagnostic Center.—Groundbreaking ceremonies for a $1,980,000 Diagnostic Center Building at University of Chicago Clinics were held April 14. The new building, to be located at 59th Street and Drexel Avenue, will provide a central location to serve the 200,000 outpatient visitors to the clinics each year. The Diagnostic Center Building will be accessible to the Univer-

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Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education, and public health. Programs should be received at least three weeks before the date of meeting.

sity of Chicago hospital group's 36 clinical areas. Maurice Goldblatt, chairman of the University of Chicago Cancer Research Foundation, and John I. Kirkpatrick, vice-chancellor of the University of Chicago, gave addresses at the ceremonies, after which Dr. Lowell T. Coggeshall, dean of the division of biological sciences of the University of Chicago, spoke at a luncheon.

Lectures on Surgical History.—Two lectures on surgical history will be presented at the International College of Surgeons Hall of Fame on May 5. Dr. Francis L. Lederer, head, department of otolaryngology, University of Illinois College of Medicine, will speak on "The Evolution of Otorhinolaryngology and Bronchoesophagology." Dr. Wayne B. Slaughter, chairman and professor in charge of plastic surgery, University of Wisconsin, Madison, and Stritch School of Medicine, Loyola University, will speak on "The History of Plastic Surgery." The lectures are open to physicians, medical personnel, and the public. Information may be had by writing Dr. Ross T. McIntire, Executive Director, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10.

INDIANA

Surgeons Meeting in Indianapolis.—The Indiana Division, U. S. Section, International College of Surgeons, will hold its annual regent's meeting at the Indiana University Medical Center, Indianapolis, May 6. Papers to be presented include "Indications for Surgery of Peptic Ulcer, and Surgical Procedures Advised," by Dr. Claude J. Hunt, Kansas City, Mo., and "Types of Colostomies and Indications," by Dr. Peter A. Rosi, professor of surgery, Cook County Graduate School, and associate professor, Northwestern University, Chicago. The banquet at the Sheraton-Lincoln Hotel (Travertine Room) will be highlighted by a talk on "Sputniks, Space, and You" by Robert J. Dryter, consulting engineer. All surgeons, medical practitioners, their ladies, and guests are invited. For information write Dr. Simon Reisler, 318 Bankers Trust Bldg., Indianapolis.

KENTUCKY

Physicians Over 85 Still Active.—Four physicians, all over 85 years of age, are still actively practicing medicine in Morganfield. Combined they have a total of 223 years of medical experience. They are Dr. John W. Conway, who has had 60 years of experience; Dr. Henry B. Allen, who has practiced 56 years; Dr. Casey B. Graves, who has practiced 54 years; and Dr. Herbert B. Stewart, 53 years.

Dr. Parker to Come to Lexington.—Dr. Joseph B. Parker Jr., associate professor of psychiatry, Duke University Medical Center, Durham, N. C., has been named psychiatry department chairman for the University of Kentucky's new medical center in Lexington. He will be professor of psychiatry and will assume his new duties late next summer. Dr. Parker is chief of psychiatric service at the Veterans Administration Hospital, Durham, N. C. Associated with Duke University since 1953, he was a member of the University of Tennessee psychiatry faculty from 1949-53. His major research interest is in the field of manic-depressive reactions. Dr. Parker recently was elected a member of the American Psychopathological Association. He is a fellow of the American Psychiatric Association and the Southeastern Psychiatric Association. His professional activities include service as director of postgraduate refresher courses in neuropsychiatry for the Southeastern Area of the Veterans Administration.

MASSACHUSETTS

New Research Training Program.—A new training program for medical researchers has been announced jointly by officials of the New England Center Hospital and the Massachusetts Institute of Technology. A grant has been made by the National Heart Institute, National Institutes of Health, to the New England Center Hospital, which includes the Pratt Diagnostic Clinic, to establish a three-year training program in cooperation with M. I. T. for clinical scientists in cardiovascular and pulmonary research. The grant will be under the direction of Dr. Samuel Proger, physician-in-chief, New England Center Hospital, and professor of medicine, Tufts University School of Medicine. In direct supervision will be Dr. Leon Cander who heads the hospital's pulmonary physiology laboratories. The program was developed by Dr. Cander in conjunction with Irwin W. Sizer, Ph.D., chairman, department of biology at M. I. T. As planned, the program will provide for the trainees to spend the first year of study as special graduate students at M. I. T., taking courses in advanced mathematics, physical chemistry, instrumentation, and other subjects applicable to their expected field of investigation. Their second year will be spent in special medical postgraduate studies at the New England Center Hospital and will include special graduate courses at M. I. T. In the third and final year each trainee will be encouraged to involve himself in a field of special investigation interest, spending his time in the Ziskind Research Laboratories of the New England Center Hospital and at M. I. T. for additional appropriate courses. For information, write the New England Medical Center, 37 Bennet St., Boston 11.

Projects to Reduce Mental Hospital Admissions.—Two research projects to reduce the number of in-patient admissions to mental hospitals, involving the use of psychiatric home treatment and a study of alternatives to hospitalization for geriatric patients, are underway at the Boston University

School of Medicine and Boston State Hospital. Both programs are supported by grants from the U. S. Department of Health, Education, and Welfare, Public Health Service, National Institute of Mental Health, and are under the direction of Dr. Walter E. Barton, of Boston, associate professor of psychiatry and superintendent of the hospital. Two teams, each consisting of a doctor, a psychiatric social worker, and a psychiatric nurse, working on the home-care project, are working in the Dorchester area of Boston, a community with 100,000 inhabitants who belong, predominantly, to the middle and lower class groups with mixed ethnic and religious backgrounds. The doctors use psychotherapy as their primary tool, as they would if they were seeing the patient in their office or an out-patient clinic. The geriatric project is being done in two stages. The first involves extensive interviews of 75 geriatric patients admitted to the hospital, their families, friends, and associates, to get as complete a picture as possible of the needs of older people, where in their lives they failed to provide for these needs, and what can be done to maintain these people in their home surroundings. The second step will involve interpretation of data to see what types of community resources are needed to allow these people to remain in their home communities, instead of admitting them to mental hospitals.

MICHIGAN

Campaign for Atomic Research Project.—The University of Michigan has launched a campaign to raise 2 million dollars for its Memorial–Phoenix Project for atomic research. At a meeting of 104 state business and industrial leaders April 1, James C. Zeder, Chrysler Corporation vice-president and campaign committee chairman, said that funds raised to establish the project in 1948 as a memorial to the university's World War II dead are nearly exhausted. A total of 8 million dollars was contributed by university students, alumni, friends, and industrial groups to start the Phoenix Project. The money has been used to build a million-watt nuclear reactor and research facilities, to support 185 research projects, to buy equipment, to free scientists for full-time investigations, and to provide information about the atomic energy field. The Phoenix Project reportedly "is the largest independent atomic research program in the world. It operates the nation's most powerful college nuclear reactor, has brought about the country's largest enrollment in nuclear engineering and science at the U-M, and has sent people to help 20 other nations set up their own peaceful A-energy programs."

Hold Open House for New Buildings.—Exhibits and demonstrations, ranging from monkey morphine addicts to laboratory research on individual cells, were displayed Feb. 22 when the University of Michigan Medical Center, Ann Arbor, held community "open house" in the new 8½-million-dollar buildings of the Medical School and School of Nursing. Over 25 exhibits were manned by faculty members of the various departments to give visitors a firsthand picture of the training and research activities. The Medical Sciences Building opened last fall and houses the departments of biological chemistry, pathology, and pharmacology. Located at the northwest corner of the Medical Center, the structure is the fifth building occupied by the Medical School since its establishment 109 years ago. Biochemists displayed a research laboratory in full operation, and pathologists opened their tissue laboratory. In the pharmacology department, visitors saw some of the 250 Indian macaca monkeys which are used in studying narcotic addiction. At the School of Nursing demonstrations of modern nursing care were given. A cancer display, a newly developed germ-free laboratory, and an apparatus which charts the effect of different drugs on a living turtle heart were featured. The new home of the Medical School consists of three interconnecting buildings linked to the University Hospital by an enclosed bridge. It contains over 123,000 square feet of teaching, research, and office space, including the administrative quarters of the two schools. The first medical building was erected in 1850 on the east side of the main campus at a cost of $9,991. In 1903, West Medical opened at a cost of $137,000 and this was followed in 1936 by East Medical, built at a cost of $858,283. Future plans call for a 9-million-dollar addition to the new Medical Sciences Building. This will be joined to the west end of the new structure and will provide space for the departments of anatomy, physiology, and bacteriology which are located in East Medical.

MISSISSIPPI

Annual State Meeting in Biloxi.—The Mississippi State Medical Association will hold its 91st annual session at the Hotel Buena Vista, May 12-14, under the presidency of Dr. Guy T. Vise, Meridian. Six section meetings will be held and the surgery section will include a panel on "Technical Mishaps Occurring During Surgery: Recognition and Management," moderated by Dr. James D. Hardy, Jackson. Dr. Louis M. Orr, Orlando, Fla., President-Elect, American Medical Association, will participate in the program, which lists the following essayists: Drs. A. Frank Adair Jr., St. Paul, Minn.; Jack R. Anderson, John Perrigo Fox, Ralph V. Platou, and Lewis J. Rutledge, New Orleans; James H. Ferguson, Miami, Fla.; Benjamin R. Gendel, Atlanta, Ga.; Phil C. Schreier and Alva B. Weir Jr., Memphis, Tenn.; and Edward R. Woodward, Gainesville, Fla. Scientific and technical exhibits are planned. Activities include a golf tournament and skeet shoot, May 13. For information write Mr. R. B. Kennedy, 735 Riverside Dr., Jackson, Miss., Executive-Secretary.

MISSOURI

Student Gets Research Fellowship.—John R. Esther, who last June finished his second year in medicine at the University of Missouri School of Medicine, Columbia, has received a postsophomore fellowship in pathology from the National Institutes of Health, Bethesda, Md., to study ways to predict in the unborn child the severity of an infant disease caused by parental differences in the Rh factor. He is now working full time on his research in the department of pathology at the Medical Center, under the direction of Dr. Joseph E. Flynn, chairman, department of pathology, and Dr. Vincent P. Perna, assistant professor of pathology. Mr. Esther is recorded as the first student in the history of the School of Medicine to be awarded a postsophomore fellowship by the National Institutes of Health of the U. S. Public Health Service.

NEW JERSEY

Conference on Mental Retardation.—The second annual Spring Conference of the Training School of Vineland will be held May 11-12, on the subject "Practical Problems" of coordinating and integrating all services related to the treatment, training, and management of the mentally retarded. Sponsors of the conference are the Training School and the New Jersey Department of Institutions and Agencies. The conference was developed under a grant from the National Institute of Mental Health. The clinical areas of psychiatry, psychology, education, speech and hearing, medicine, social work, and daily care will be represented. The conference goal is to produce a set of written, specific, desirable practices of coordinating and integrating information which can be used by workers in schools, institutions, clinics, other agencies and private practice. The conference is composed of panels and subworkshops, with representatives from the seven clinical areas represented in each. Two lectures will be presented: "Diagnosis . . . Original and Continuing," by Dr. Margaret J. Giannini, administrative director, Mental Retardation Clinic, New York Medical College; and "Recommendations by Clinicians," by Dr. William P. Hurder, of Atlanta, Ga., assistant director for mental health, Southern Regional Education Board. For information write Walter Jacob, Ph.D., Director, The Training School, Vineland, N. J.

NEW YORK

Dr. Lotspeich to Come to Rochester.—Dr. William D. Lotspeich, chairman, physiology department, University of Cincinnati College of Medicine, since 1951, will come to the University of Rochester School of Medicine and Dentistry as chairman of its department of physiology. Dr. Lotspeich will begin his new duties at the Medical School July 1, succeeding Wallace O. Fenn, Ph.D., who has headed the department since 1924. Dr. Fenn is retiring from the chairmanship but will continue as professor of physiology. Dr. Lotspeich is also Joseph Eichberg Professor of Physiology. After serving as instructor and assistant professor in physiology at Syracuse University College of Medicine from 1947 to 1949, Dr. Lotspeich spent two years as a research fellow in biochemistry at Oxford University, England, where he worked on tissue metabolism with Sir Rudolph Peters. He is a member of the Physiological Study Section of the National Institutes of Health, U. S. Public Health Service, and of the Advisory Council, Life Insurance Medical Research Fund of New York.

New York City

City Hospital Restores Name.—New York City's new municipal hospital, known for a brief time as Elmhurst General Hospital, has had restored to it its former name of City Hospital. Founded in 1832, it has a bed capacity of 1,066 and serves as the municipal hospital for half the borough of Queens, which now comprises two million people.

Lecture on Radiation Therapy.—The Radiation Therapy Alumni Association of Bellevue Hospital announced that the eighth annual Ira I. Kaplan Lecture, "Megavoltage X-Ray Therapy," will be given by Dr. John W. Boland, director of radiotherapy, Mt. Sinai Hospital, on May 7, 5:30 p. m., at the New York University Bellevue Medical Center, 31st Street and First Avenue, Founders Hall.

Establish Annual Fried Lecture.—Patients of Dr. Boris M. Fried have established an annual lecture at New York Medical College in his honor to be known as the Dr. B. M. Fried Lecture. The first address was given March 13. Wendell J. Krieg, Ph.D., professor of anatomy, Northwestern University Medical School, Chicago, was the speaker. Dr. Fried, clinical associate in the department of medicine at New York Medical College, has served on the staff of the department of pathology, Harvard Medical School, and has done experimental pathology at the Peter Bent Brigham Hospital, Boston. Later he was a research fellow in pathology at Mount Sinai Hospital.

Dr. Loeb Receives Kober Medal.—Dr. Robert F. Loeb, professor of medicine, Columbia University, since 1938, has been awarded the Kober Medal for 1959. The medal is provided for by the Kober Foundation, established at Georgetown University, Washington, D. C., in 1923. Dr. Loeb was selected for this year's medal by the Association of American Physicians "in recognition of his contributions to the progress of the medical sciences." He will receive the award at the association's annual meeting in Atlantic City in May. Dr. Loeb, who holds honorary doctorate degrees from the Universities of Chicago, Paris, Strasbourg, and Wales, was Lambert

Professor of Medicine at Columbia from 1942 to 1947 and has been Bard Professor of Medicine there since 1947. The award of the Kober Medal is provided for by an endowment fund established in 1923 by Dr. George M. Kober to commemorate the 50th anniversary of his graduation in medicine from Georgetown. The fund also pays the expenses of an annual lecture on a medical subject, a scholarship in the Georgetown Medical School, and a gold medal "to be awarded to the best student in hygiene."

Exhibit of Books on Physicians.—On view at The New York Academy of Medicine is an exhibit entitled "Books About Physicians" devoted to literary contributions by physicians and about medical life. In the category devoted to the physician in fiction is a copy of Sinclair Lewis' "Arrowsmith," deposited in the Library by Paul De Kruif, Ph.D., who collaborated on the work. One exhibit case is devoted to Dr. Hans H. Zinsser, a native New Yorker, who for many years held the chair of bacteriology and immunology in the College of Physicians and Surgeons and was later appointed to a similar chair in the Harvard University Medical School, Boston. He was distinguished as a teacher, investigator, literary man, and poet. Three cases are devoted to physicians and medicine as portrayed in fiction and drama, from the works of Rabelais to Doctor Zhivago. There are medical essays of distinguished physicians, such as Maimonides of the 12th century and Oliver Wendell Holmes of the 19th. Medicine's modern poets Merrill Moore and William Carlos Williams are represented. A number of autobiographies by medical men are exhibited. Other cases hold narratives of medical missionaries and a wide variety of contributions shown in anthologies. The exhibit will be on display in the library through June 30.

PENNSYLVANIA

Industrial Scientists Honored.—Dr. Karl H. Beyer Jr. and James M. Sprague, Ph.D., of West Point, will receive the Merck Board of Directors' Scientific Award for scientific accomplishments. A means of honoring industrial scientists, the award takes the form of an appropriate scroll setting forth the scientist's achievements and a grant of funds by Merck to one or more educational institutions to support an appropriate educational activity in the scientist's name. The institution is chosen by the recipient and the type of educational activity is developed by the recipient and the university. In honor of Dr. Beyer, the Merck board is granting $25,000 to the University of Wisconsin to establish the Karl H. Beyer Jr. Visiting Professorship in the university's School of Medicine. Of the $25,000 appropriated in honor of Dr. Sprague, the board is granting $10,000 to Franklin College (Franklin, Ind.) to set up the James M. Sprague Science Award, to provide financial assistance to "exceptionally able" students in natural science. The sum of $15,000 is being granted to the University of Wisconsin to establish the James M. Sprague Fund to be used by the university's department of chemistry for a visiting lectureship in organic chemistry, the James M. Sprague Lectureship. The Directors' Scientific Award was established by the Merck Board in 1951 at the suggestion of former company president James J. Kerrigan. These awards now support the Karl Folkers Lecture Series in Chemistry at the Universities of Illinois and Wisconsin, the Lewis Hastings Sarett Scholarship in Chemistry at Northwestern and Princeton Universities, the Max Tishler Prize Scholarship at Tufts College, and the Max Tishler Lectures in Chemistry at Harvard University.

Philadelphia

Foreign Visitors.—The University of Pennsylvania School of Medicine's department of psychiatry was visited by five foreign psychiatrists at a special round-table conference on psychiatric education March 23. The visitors included Dr. Hans Hoff, chairman, department of psychiatry, University of Vienna; Dr. Pierre Deniker, senior lecturer, University of Paris; Dr. Roland Kuhn, professor of psychiatry, University of Zurich; Dr. Michael Shepherd, department of psychiatry, University of London; and Dr. Hanns Hippius, department of psychiatry, University of Berlin.

Personal.—Dr. Albert P. Seltzer has been appointed as senior attending otolaryngologist to the Albert Einstein Medical Center, Southern Division, Philadelphia.——Dr. Edward L. Bortz, formerly president of the American Medical Association, and now chief, medical service, the Lankenau Hospital, Philadelphia, was named chairman of the 1960 National Health Forum. The forum, an annual national conference, is sponsored by the National Health Council on behalf of its more than 60 member agencies.——Dr. C. Wilmer Wirts, associate professor of medicine, Jefferson Medical College, was awarded a scroll March 18 in recognition of his service rendered during his three-year term (1957-59) as director of the Postgraduate Institute of the Philadelphia County Medical Society.

Undergraduate Education Via Television.—An experiment linking five major medical schools by closed-circuit TV was held March 31-April 10. Joining in this network for undergraduate medical education were the University of Pennsylvania School of Medicine, Jefferson Medical College, Temple University School of Medicine, Hahnemann Medical College, and Woman's Medical College of Pennsylvania. The programs were produced by the Medical Education Service Unit of Smith Kline & French Laboratories, Philadelphia. The special telecasts, a series of five lectures by Dr. Joseph W. Spelman, medical examiner for the City of Philadelphia, reportedly marked the first time that five medical schools used the technique of television for joint lecture-demonstration purposes. About 1,300 students in selected classes of the schools watched the color telecasts on screens as large as 4½-by-6 feet in their own auditoriums. The series of 45-minute programs was arranged under the subject, "Forensic Medicine." A telephone hook-up was used to relay the students' questions directly to Dr. Spelman through a moderator at each of the schools. The idea for the lecture series grew out of talks between Dr. Charles S. Cameron, dean of Hahnemann Medical College, and officials at Smith Kline & French.

SOUTH CAROLINA

Annual Meeting in Columbia.—The South Carolina Medical Association will hold its annual meeting in Columbia, May 13-14. Two panel discussions are planned on (1) cancer, and (2) vascular disease, moderated by Dr. Harold R. Pratt-Thomas and Dr. Robert Wilson, Charleston, respectively. The following papers will be presented by out-of-state speakers:

Doctor Looks at the Problem of Radiation Hazards, Dr. Eugene P. Pendergrass, Philadelphia.
Advances in Cancer Control, Dr. John R. Heller, Bethesda, Md.
Fenestration Operation on Ear, Dr. J. Brown Farrior, Tampa, Fla.
Some Pediatric Orthopedic Problems, Dr. William T. Green, Boston.
Vesicoureteral Reflux in Children: Diagnosis and Management, Dr. Victor A. Politano, Durham, N. C.
Problems in Staphylococcus Infection, Dr. Walter A. Murray, Columbus, Ohio.

A Clinicopathologic conference is scheduled for the afternoon of May 14. Speaker at the annual banquet that evening will be Dr. Gunnar Gundersen, La Crosse, Wis., President, American Medical Association. For information write Mr. M. L. Meadors, 309 W. Evans St., Florence, S. C.

TENNESSEE

Society Elections.—The Tennessee State Orthopaedic Society held its 11th annual meeting at the University of Tennessee College of Medicine March 15. Dr. George W. Shelton was elected president; Dr. W. Houston Price, vice-president; Dr. Maurice A. Canon, secretary-treasurer. The 1960 meeting will be held in Chattanooga.——The following are officers of the Nashville Academy of Medicine for 1959: president, Dr. Rollin A. Daniel Jr., and secretary-treasurer, Dr. Douglas H. Riddell, 2318 W. End Ave., Nashville 5, Tenn.

Name Dr. Zilversmit Heart Investigator.—Donald Zilversmit, Ph.D., professor of physiology, University of Tennessee, Memphis, was named the seventh "Career Investigator" of the American Heart Association. Career investigators are "outstanding scientists" who receive support from the American Heart Association throughout their productive lives. In his studies Dutch-born Dr. Zilversmit has concentrated on the body's use of lipids. The investigatorship provides $30,000 annually to cover the investigator's salary and to help underwrite the expenses of his laboratory. Its purpose is to relieve leading investigators of financial and other pressures and permit them to work without interruption on problems of their own choosing.

Personal.—Dr. Frank L. Roberts, associate dean, University of Tennessee College of Medicine, Memphis, will go to Iran for two years as a consultant in medical education of the University of Shiraz, an English-speaking university in southern Iran under auspices of the International Cooperation Administration.——Thomas P. Nash Jr., Ph.D., professor of chemistry and dean of the School of Biological Sciences, University of Tennessee Medical Units, Memphis, has won the 1958 Southern Chemist Award of the American Chemical Society's Memphis Section. The gold medal, given annually "for distinguished service to the profession of chemistry in the Southern states," was presented to Dr. Nash at a banquet at the University of Florida Dec. 12.

Dr. Rogers Named Department Head.—Dr. David E. Rogers, associate professor of medicine and chief of the division of infectious disease, New York Hospital, Cornell Medical Center, was named professor of medicine and head of that department at Vanderbilt University School of Medicine, Nashville. Dr. Rogers, whose appointment will take effect at the beginning of the 1959-1960 academic year, succeeds Dr. Hugh J. Morgan, who retired last June. Since June the department has been directed by a committee, with Dr. Rudolph H. Kampmeier as chairman. Dr. Rogers was appointed assistant professor of medicine on the New York Hospital–Cornell faculty in 1954, spent the following year as visiting investigator at the Rockefeller Institute for Medical Research, was made chief of the division of infectious disease in 1955, and was promoted to associate professor in 1956.

UTAH

Dr. Scott M. Smith Honored.—Dr. Scott M. Smith, of Salt Lake City, received the citation of merit award from the University of Missouri Alumni Association April 7. The presentation was made at the Medical School Alumni lunchen in connection with the Missouri State Medical Association meeting. Dr. Smith, associate clinical professor, department of anesthesiology, University of Utah College of Medicine, was elected president of the American Board of Anesthesiology in 1958 and has been a board member since 1950. He was president of the American Society of Anesthesiologists in 1956, and became secretary of the American Academy of Anesthesiology in 1957. In the American Medical Association he was chairman of the section on anesthesiology in 1957 and for eight years was representative to scientific exhibits on anesthesiology.

VERMONT

Iranian Visitor.—Dr. Sh. Mofidi, professor, University of Teheran, Iran, was a visitor at the University of Vermont College of Medicine, Burlington, recently, observing the teaching of preventive medicine and discussing the problems of selecting and evaluating students for admission to medical school. Dr. Mofidi returned a visit to Iran made by Dean George A. Wolf Jr. last summer.

VIRGINIA

Dr. Paquin Comes to Charlottesville.—Dr. Albert J. Paquin Jr. was appointed professor of urology and chairman of the department of urology, University of Virginia School of Medicine, Charlottesville, effective May 1. Dr. Hugh Warren, associate professor of urology, has served as acting chairman of the department since the death of Dr. Samuel A. Vest Jr. last April. Dr. Paquin comes to the University of Virginia from Cornell University Medical College, New York City, where he was associate professor of clinical surgery and urology since July 1, 1957, and associate attending surgeon in urology at the New York Hospital-Cornell Medical Center. Dr. Paquin's interests have centered on the urological problems of childhood and the metabolic derangement induced by surgical trauma. He plans to continue this research.

Annual General Practice Meeting.—The ninth annual scientific assembly of the Virginia Academy of General Practice will be held May 7-10 at the Jefferson Hotel, Richmond. The morning of May 8 will be devoted to a program of the Virginia Diabetes Clinical Society and that afternoon the annual business meeting will be held. The following papers will be presented by out-of-state speakers:

Early Diagnosis of Uterine Cancer, Dr. C. Bernard Brack, Baltimore.

The Hirsute Female, Dr. Robert B. Greenblatt, Augusta, Ga.

Some Problems in Geriatric Medicine, Dr. Edward Henderson, Montclair, N. J.

The Child Handicapped by Nephrosis, Dr. Milton Rapoport, Philadelphia.

The Child Handicapped by Cerebral Palsy, Dr. George G. Deaver, New York City.

Man in Space, Capt. W. M. Snowden, Washington, D. C.

Therapeutically Induced Weight Gains in Hypertensives, Dr. Harold Feldman, Livingston, N. J.

Newer Concepts in the Treatment of Common Skin Diseases, Dr. Edmund F. Finnerty Jr., Boston.

Present Status of Adrenocortical Steroid Therapy, Dr. Nicholas E. Capeci, West Point, Pa.

Treatment of Hypertension, Dr. Francis L. Chamberlain, San Francisco.

Two motion pictures will be shown and exhibits are planned. Guest speaker at the annual banquet May 9, 7:30 p. m., will be Mr. T. Coleman Andrews, of Richmond, who will present "Wasteful Spending, Confiscatory Taxation and Inflation Are Not Laughing Matters." For information write the Virginia Academy of General Practice, 4205 Dover Road, Richmond 21, Va.

WASHINGTON

Appoint English Microbiologist as Laboratory Chief.—Dr. John C. Sherris, of Manchester, England, a member of the University of Manchester faculty, has been appointed chief of the Microbiology Laboratory of the University of Washington Teaching and Research Hospital, Seattle. Dr. Sherris, a graduate of Middlesex Hospital Medical School of London University, received his bachelor of medicine and bachelor of science degrees in 1948 and his doctor of medicine degree in 1950. He has been senior lecturer in bacteriology at the University of Manchester since 1956. Dr. Sherris' research has been in the application of experimental methods to problems in the diagnosis, treatment, and prevention of infectious disease in man.

WISCONSIN

Dr. Evans to Head New Department.—Dr. Alfred S. Evans, who for the past six years has been director of the Preventive Medicine Section of Student Health and associate professor of medical microbiology, University of Wisconsin Medical Center, Madison, has recently been appointed chairman of the newly established department of preventive medicine at the center and director of the State Laboratory of Hygiene. To develop a "broad and vigorous program" in preventive medicine and public health, the department has been completely divorced from the student health program and its educational and research activities merged with the program of the state Laboratory of Hygiene. However, the Laboratory of Hygiene shall continue to function as a separate unit—with Dr. Evans heading both departments. Dr. Evans has been associated with the University of Wisconsin Medical Center since 1952 and has held various positions on the staff of Yale University, New Haven, Conn. Dr. Evans will replace retiring Dr. William D. Stovall as director of the state Laboratory of Hygiene. Dr. Stovall, who headed the program for over 30 years, has agreed to stay on as acting director until Sept. 1 to allow Dr. Evans to study epidemiology and public health at the University of Michigan School of Public Health.

GENERAL

Travel Grants for Goiter Conference.—The fourth International Goiter Conference will be held July 5-9, 1960, in London, England, under the auspices of the London Thyroid Club and the American Goiter Association. The American Goiter Association plans to make available "to worthy candidates" a limited number of travel grants for participants of this meeting. Application blanks are available from Dr. John C. McClintock, 149½ Washington Ave., Albany 10, N. Y., U. S. A. Applications will be received until Jan. 1, 1960.

Dr. Smith Goes to Washington.—The Pharmaceutical Manufacturers Association named Dr. Austin Smith, former editor of THE JOURNAL as its first full-time salaried president following a year of presidency of George F. Smith, who served as the first president after the 1958 merger combining the American Drug Manufacturers Association and the American Pharmaceutical Manufacturers Association. Dr. Smith will be located at PMA's Washington headquarters. Since 1953 he has been executive editor of the *World Medical Journal* and since 1954 has served as chairman of the board of the U. S. Committee, World Medical Association.

Otoophthalmological Meeting in Las Vegas.—The Pacific Coast Oto-Ophthalmological Society's annual meeting will be held May 3-7 at the Hotel Riveria, Las Vegas, Nev. Guest speakers will include: Drs. Robert R. Newell, San Francisco; William P. Mikkelsen, Los Angeles; James F. Crow, Ph.D., Madison, Wis.; Stuart C. Cullen, San Francisco; George E. Shambaugh Jr., Chicago; Sidney Riegelman, Ph.D., San Francisco; Lawrence R. Boies, Minneapolis; Dean M. Lierle, Iowa City; A. Edward Maumenee, Baltimore; John W. Henderson, Rochester, Minn.; and Morton D. Leigh, Los Angeles. The social events committee has planned programing for the members and their wives during the meeting. The President's Reception and Buffet Supper will be held Sunday evening, May 3. For information write Dr. Homer E. Smith, 686 Twelfth Ave., Salt Lake City 3, Utah, Executive Secretary-Treasurer.

Annual Psychosomatic Meeting.—The American Psychosomatic Society's 16th annual meeting will be held at Chalfonte-Haddon Hall, Atlantic City, May 2-3. The program will consist of three general sessions, a portion of one of which will be set aside for Prof. P. K. Anokin, chief, department of neurophysiology, Academy of the Medical Sciences, U. S. S. R. His subject will be "On the Specific Character of the Activating Influence of the Reticular Formation on the Cerebral Cortex." A fourth session will be allotted to the panel presentation of "Problems of Specificity in Psychosomatic Disorders." This panel will deal with the report of the findings of the long-term study of the Chicago Institute for Psychoanalysis. The registration fee for nonmembers is $5. Students, interns, residents, and fellows will be admitted to the sessions upon payment of $1 and presentation of proper identification. For information, write the American Psychosomatic Society, 265 Nassau Road, Roosevelt, N. Y.

Current Poliomyelitis Morbidity Trends.—The Communicable Disease Center, Atlanta, Ga., reported that during the week ending March 28, there were 19 cases of poliomyelitis reported to the National Office of Vital Statistics, of which 15 were paralytic. The total for the preceding 6-week period was 136 cases, higher than the 84 cases during the comparable period in 1958, but lower than the 215 cases reported during this same interval in 1957. The only known concentration of cases in 1959 has been in Pike County, Mo. Since the last week in December, 15 cases of poliomyelitis were reported from Pike County, by Dr. Edgar A. Belden, director, Bureau of Communicable Disease Control, Missouri Division of Health. All cases were members of an Amish Mennonite Community of about 350 persons divided among 50 families. Of these 15 cases, 7 were paralytic and 8 nonparalytic. One fatality has been reported. The 34 cases reported from Florida, 22 paralytic, are distributed throughout the state, in a pattern following the population density.

Cardiology Meeting in Philadelphia.—The American College of Cardiology will hold its eighth annual convention at the Benjamin Franklin Hotel, Philadelphia, May 25-29, 1959. The program covers recent trends in medical and surgical progress in cardiology. Dr. John S. LaDue, New York City, is national chairman, program committee; Dr. Robert P. Glover, Philadelphia, is advisory chairman to the local committee in charge of convention arrangements; Dr. Seymour Fiske, New York City, is national chairman. Dr. Claude S. Beck, Cleveland, is moderator of a scientific session on surgical problems in coronary and valvular heart disease, featuring new techniques, use and abuse of pump oxygenators, pacemakers, and the evaluation of postoperative syndromes. Dr. Ashton Graybiel, Pensacola, Fla., has arranged a special session on the newer challenges in aviation medicine and the newer aspects of space cardiology. There will be scientific sessions devoted to phonocardiography, ballistocardiography, metabolism, and therapy. Fireside conferences will allow audience participation in discussion of clinical and research problems. For information write the Secretary, Dr. Philip Reichert, American College of Cardiology, Empire State Bldg., New York 1.

Northern Tri-State Meeting.—The 86th annual meeting of the Northern Tri-State Medical Association will be held at the Schuler Hotel, Marshall, Mich., May 7, under the presidency of Dr. James E. Bailey, Coldwater, Mich. The following papers are scheduled:

Open Reduction, Primary and Secondary Fusions in Fractures of the Os Calcis, Dr. Homer H. Stryker, Kalamazoo, Mich., and Dr. Harold J. Meier, Coldwater, Mich.
Diagnosis and Treatment of Peripheral Vascular Disease of the Lower Extremities, Dr. D. Emerick Szilagyi, Detroit.
Investigation and Treatment of Recurrent Urinary Calculus Disease, Dr. William C. Baum, Grand Rapids, Mich.
Commercial Insurance Looks at Blue Cross, R. L. Paddock, president, Time Insurance Company, Milwaukee, Wis.
Laboratory Aids in the Differential Diagnosis of Functional Gynecological Disorders, Gardner M. Riley, Ph.D., Ann Arbor, Mich.
Chemotherapy of Leukemia and Lymphoma, Dr. Frank H. Bethell, Ann Arbor, Mich.

At the luncheon meeting an address will be given by Rev. Calvin Didier, LaPorte, Ind., on "How Much Does The Spirit Weigh." A ladies' program is arranged. For information write Dr. Francis E. Elliott, Northern Tri-State Medical Association, 130 N. Fulton St., Wauseon, Ohio, Secretary-Treasurer.

Bacteriologists Meet in St. Louis.—The 59th general meeting of the Society of American Bacteriologists will be held May 10-14 at the Sheraton-Jefferson and Statler Hotels, St. Louis, with the Eastern Missouri Bacteriologists as hosts. P. R. Edwards, Communicable Disease Center, Chamblee, Ga., president of the society, will open the meeting. The ONR Lecture, "The Three Faces of Immunology," will be given by Ashley A. Miles, of the Lister Institute of Preventive Medicine, London, England. Over 400 papers are scheduled for presentation under four division headings. The following five symposiums are arranged: "Steroid Metabolism," "Biology of Cells Modified by Viruses or Antigens," "Infectious Agents and Phagocytic Cells," "Initiation of Bacterial Growth," and "Microbial Genetics." A. A. Newton, department of pathology, University of Cambridge, England, will give "Infection of Synchronously Dividing HeLa Cells by Herpes Simplex Virus," and "Antimicrobial Properties of Progesterone Analogues" will be given by C. Casas-Campillo, with Dora Balandrano and A. Galarza, Research Laboratories, Syntex, S. A., Mexico, as co-authors. Scientific motion pictures and commercial and scientific exhibits are planned. A program of ladies' activities and tours are arranged. For information write Mr. Samuel G. MacFarlane, 428 E. Preston St., Baltimore 2, Business Manager.

Mental Health Study in South.—A state-by-state study of mental health research in the Southern region has been launched by the mental health program of the Southern Regional Education Board, according to Dr. William P. Hurder, director of the program. The study is designed to get detailed information about the Southern region's resources and needs in mental health and behavioral science research, including research in mental retardation. It will provide an estimate of research projects in progress and how they are being carried out. Over 2,000 questionnaires have been distributed to research personnel and their administrators throughout the region with the cooperation of a committee of research survey chairmen appointed by the governor of each participating state. The cooperation of the Bio-Sciences Information Exchange and the Council of State Governments will supplement the study findings and broaden the scope of the data gathered. The regional mental health program was established in 1954 by the SREB at the request of the Southern Governors' Conference and is supported by an appropriation of $8,000 from each participating state. Its purpose is to aid states and Southern colleges and universities to train more qualified personnel for mental health programs and to aid in securing added support for needed research programs.

Establish Medical Council for Kansas City.—The Medical Council of the Metropolitan Area of Greater Kansas City was formally established at an organizational meeting March 16 in Kansas City. The members are the Clay County (Mo.) Medical Society, Jackson County (Mo.) Medical Society, Johnson County (Kan.) Medical Society, and Wyandotte County (Kan.) Medical Society. The immediate past-president, the president, and the president-elect or vice-president are designated as representatives of the society. The secretaries also attend meetings of the representatives in an ex officio capacity. The Medical Council, following a pattern established in the Washington, D. C. Metropolitan Area and also by the First District Branch of the Medical Society of the State of New York, has the purpose "to unify and give effect to the policies and purposes of the organized medical profession of Greater Kansas City to serve, sustain and promote the public health and welfare in matters involving the Metropolitan Area of Greater Kansas City; to promote programs designed to enhance the health and welfare of the people; and to fulfill on an area level, the established common purposes of the several county medical societies of this Council with due regard to the autonomy and authority of each county medical society." Membership is open to the county medical societies in the Metropolitan Area that may desire to participate. Dr. Dillard M. Eubank, of Kansas City, Mo., was selected chairman.

Establish Fellowship for Physician from India.—The creation of the Merck Sharp & Dohme International Fellowship in Rehabilitation for a physician from India to undertake advanced training in the United States has been announced. The fellowship will provide a minimum of one year of training in physical medicine and rehabilitation. Initial screening of applications will be done by a committee of Indian leaders in health and medical education. The international fellowship was made possible by a contribution of $10,000 to the World Rehabilitation Fund by the Merck Company Foundation on the recommendation of Merck Sharp & Dohme International Division, Merck & Co., Inc. The fellowship will be administered by the World Rehabilitation Fund, an American voluntary organization, in cooperation with the International Society for the Welfare of Cripples. The latter's affiliate in India is the Indian Society for the Rehabilitation of Crippled Children, of which Dr. Mrs. Gulbanoo Premji, Haji Ali Park, Clerk Road, Mahaluxmi, Bombay, is the national secretary. The World Rehabilitation Fund is a nonprofit organization supported by American industry, foundations, and individuals to assist in the international development of rehabilitation services for the physically handicapped. Currently there are 71 trainees (57 physicians and 14 nonphysicians) from 35 different nations who receive long-term advanced training in the United States under the auspices of the fund. Its honorary chairmen include Mr. Herbert Hoover, Mr. Harry S. Truman, and Mr. Bernard M. Baruch.

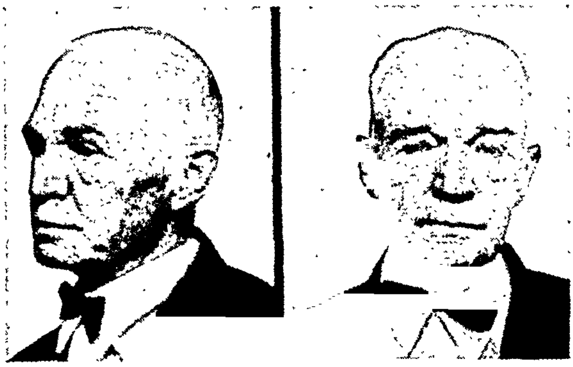
Tornadoes Take Fewer Lives.—The Statistical Bulletin of the Metropolitan Life Insurance Company has stated that the death toll from tornadoes in the United States was lower in the past five years than in any comparable period since the Weather Bureau began to keep systematic records of such storms more than 40 years ago. In the period 1954-1958 tornadoes took about 500 lives, half the loss sustained in each of the preceding five-year periods and little more than one-fourth the toll in 1924-1928. The reduced death toll in recent years reportedly has been due in part to improved tornado detection and warning services. The recent decrease in fatalities has been especially marked in the Southwest. There were 117 tornado deaths in the West South Central region during 1954-1958, compared with 444 five years earlier and with 507 in 1944-1948. Arkansas had only seven tornado deaths in the past five years, a small fraction of the losses suffered in the periods immediately preceding. Texas likewise experienced unusually small numbers of fatalities in recent years. Only three states—all of them in the Midwest—recorded an increasing number of tornado deaths in the period under review. Kansas, which had only five fatalities in 1944-1948 and 11 in the next five years, had 106 deaths in 1954-1958, a greater loss than that experienced by any other state in this period. Wisconsin suffered 37 fatalities in the recent five-year period while Missouri recorded 59 such deaths. The tornado which struck St. Louis early in February of the current year took 21 lives.

Foreign Speakers at Section Centennials.—Seven sections of the Scientific Assembly of the American Medical Association are celebrating their centennials in Atlantic City. Among the centennial participants will be several foreign speakers. R. R. A. Coombs, Ph.D., professor of pathology, University of Cambridge, England, will be the guest centennial speaker for the Section on Pathology and Physiology June 11, in the ballroom of the Shelburne Hotel. His subject will be: "Demonstration of Antigens on Tissue Cells by the Mixed Agglutination Reactions." Mr. Andrew M. Claye, president, Royal College of Obstetricians and Gynecologists, Leeds, England, will be the speaker at a commemorative luncheon in celebration of the 100th anniversary of the founding of the Section on Obstetrics and Gynecology, June 10, in the ballroom of the Sheraton–Ritz Hotel. On June 12, Dr. Coombs and Mr. Claye will be participants in a panel discussion on erythroblastosis fetalis in a joint meeting of the Section on Obstetrics and Gynecology and the Section on Pathology and Physiology, commemorating the 100th anniversary of both sections. This will take place in Trimble Hall, Claridge Hotel. Dr. Jeremy N. Morris, London Hospital Research Laboratories, Ashfield Street, London, will be the guest centennial speaker at the joint meeting of the Section on Experimental Medicine and Therapeutics and the Section on Internal Medicine, which is scheduled for Thursday afternoon in the ballroom of Cenvention Hall. He will take part in a symposium on "Basic Problems of Coronary Disease Today" and will speak on "Occupation and Heart Disease."

Study of Hospital Admissions.—The National Opinion Research Center of the University of Chicago has embarked on a two and one-half year study of hospital admissions. The Health Information Foundation granted $200,000 to the center to investigate the full range of reasons for admitting patients. Chauncy D. Harris, Dean of the Division of Social Sciences of the university and a trustee of the center, announced the grant and said that a systematic study would be made on the medical, social, personal, and professional reasons behind a stay in the hospital. "The aim of this investigation is to develop a better understanding of the role of the hospital and the demands upon it by the community." Of special interest and study will be the bearing of hospital insurance coverage on decisions to hospitalize or not to hospitalize when other factors affecting the decision are controlled, Harris said. Mr. Clyde W. Hart, director of the National Opinion Research Center, said that hospital admissions throughout the nation exceed 20 million annually. He said that the study for the Health Information Foundation will be based on a sample of admissions to hospitals in the state of Massachusetts. Cooperating will be the Massachusetts Medical Society, the Massachusetts Hospital Association and the Blue Cross-Blue Shield plans in the state. The Health Information Foundation was organized in 1950 as a contribution by the drug, pharmaceutical, chemical, and allied industries to research and education in the social and economic aspects of medical care. The National Opinion Research Center is a specialized research agency affiliated with the University of Chicago. It undertakes specific projects in gaining information on social and scientific problems and collects original data for its reports.

Conference on Legal Environment of Medical Science.—The National Society for Medical Research in conjunction with the University of Chicago has called the first National Conference on the Legal Environment of Medical Science, "to bring order into . . . the laws and regulations governing medical research." The meeting will be held May 27-28 on the University of Chicago campus. Practical problems such as access to cadavers and obtaining animals for humane use in laboratories has stimulated the society, whose membership includes all the accredited medical schools and most medical research associations, to issue a call for clarification of standards. Participants will include scientists, legal scholars, religious leaders, and representatives of various groups affected by differing practice, decisions, and laws. The conference will focus on three major fields: medical experiments on human subjects; medical studies involving the use of dead human bodies; and medical experiments on animal subjects. The conference will attempt to reach agreements on ethical standards for the experimental use of human volunteers, cadavers, and laboratory animals. The conferees will seek to develop principles for a model legal code to govern research in medicine. Rev. Thomas J. O'Donnell, S. J., regent, Georgetown University School of Medicine, will be chairman of the section on human experimentation. Russell T. Woodburne, Ph.D., professor of anatomy, University of Michigan School of Medicine, Ann Arbor, will be the chairman of the section on the use of cadavers. William T. S. Thorp, D.V.M., dean, College of Veterinary Medicine, University of Minnesota, Minneapolis, will be the chairman of the section on animal experimentation. Irvin Ladimer will serve as conference secretary. Inquiries should be addressed to the National Society for Medical Research, 920 S. Michigan Ave., Chicago 5.

Wanted by the FBI.—William Milton Hoffman, who may seek treatment for a stomach ailment and is known to have had tuberculosis, is being sought by the FBI for unlawful flight to avoid confinement for armed robbery. On Feb. 11, 1949, Hoffman was apprehended at Surfside, Fla., and was returned to Michigan, where he was sentenced to serve 10 to 20 years in the State Prison at Jackson. He escaped confinement Oct. 11, 1952. Hoffman has been convicted for burglary, larceny, and armed robbery. He should be considered dangerous. A federal complaint was filed at Detroit in 1956, charging Hoffman with violation of the unlawful Flight to Avoid Confinement Statute. He was born in 1895 in Carter County, Ky.; height 5 ft. 8 in.; weight 128 lbs.; gray hair; blue eyes; medium complexion; race, white; occupation, plumber, telegraph operator. He has ¾-in. scar on back of head; cut scar in left eyebrow; moles below left eye; above right eye; and on right side of chin; ⅝ in. oblique scar below left wrist; two scars on second joint of left thumb; 1 in. oblique scar on palm of right hand near wrist. Hoffman is said to be a gambler, particularly on horse races. He has used these aliases: William Halliday; William Jennings Hoffman; Edward Holliday; William Huffman; William Marvin; William Murry; Raymond O'Brien; John Russell; Frank Webber; Frank Williams, and others. Anyone able to assist in locating this fugitive is requested to notify the Director of the Federal Bureau of Investigation, U. S. Department of Justice, Washington 25, D. C., or the Special Agent in Charge of the nearest FBI Division, the telephone number of which may be found on the first page of local telephone directories.



William Milton Hoffman

Award in Laryngology and Rhinology.—The American Laryngological Association announced that a sufficient fund has accrued from the Casselberry Fund "for encouraging advancement in the art and science of laryngology and rhinology," and that this sum is now available in part or as a whole, for a prize award. Theses must be in the hands of the Secretary of the American Laryngological Association, Dr. James H. Maxwell, Out-Patient Building, University Hospital, Ann Arbor, Mich., by Jan. 1. The Casselberry Award is a prize of money with accompanying certificate. The sum of money will be agreed upon by the council of the association after the manuscript has been evaluated by the Award Committee. It may be awarded in whole or in part among several contestants. Eligible contestants may be: (1) hospital interns, residents, or graduate students in rhinology and laryngology; (2) an individual with an M.D. degree actively practicing or teaching rhinology and laryngology in the Americas; (3) any scientific worker in rhinology and laryngology. Manuscripts shall be presented under nom de plume which shall in no way indicate the author's identity. There shall also be a sealed envelope bearing the nom de plume and containing a card showing the name and address of the contestant which the secretary shall keep. Manuscripts must be limited to 5,000 words and must be typewritten, double spaced on one side of the sheet. *The thesis shall not have been published elsewhere.* The successful thesis shall become the property of the association but this provision shall in no way interfere with publication of the thesis in the journal of the author's choice. Unsuccessful contributions will be returned promptly. The award, to be made at the annual meeting of the American Laryngological Association, shall be based on: originality of material; scientific and clinical value; suitability for this award; method of presentation as to style, illustrations, and references. The maximum amount shall not exceed $200.

FOREIGN

Plan Rehabilitation Center in Philippines.—What is reportedly the first community rehabilitation center in the Far East is to be developed in San Pablo, the Philippines, the Republic of the Philippines Ambassador to the United States, Carlos P. Romulo, announced in a press conference held at the Institute of Physical Medicine and Rehabilitation, New York City. Also participating in the press conference were Mr. George Hampton, senior executive vice-president, whose company, General Foods Corporation, granted the funds for the project, and Dr. Howard A. Rusk, president, World Rehabilitation Fund, and director, Institute of Physical Medicine and Rehabilitation. The San Pablo Rehabilitation Center is an out-patient rehabilitation center. It will provide medical, physical therapy, social work, prosthetics, bracemaking, and related rehabilitation services to the community of San Pablo. In addition to a medical director, the center will have a full-time staff of nine persons initially. Dr. Rusk explained that although there are a number of governmental or university-operated rehabilitation centers in the Far East including that of the National Orthopedic Hospital in Manila, the San Pablo Rehabilitation Center is the first to be community-sponsored and community-operated. Six physicians from the Philippines have returned to the Philippines within the past three years after receiving long-term postgraduate training in physical medicine and rehabilitation within the Department of Physical Medicine and Rehabilitation, New York University-Bellevue Medical Center, and six additional physicians and a social worker from the Philippines are currently enrolled in such advanced training.

CORRECTIONS

Committee on Hypnosis.—The item in the Organization Section entitled "New Committee on Hypnosis" (March 21, page 1339) inadvertently omitted the fact that Dr. M. Ralph Kaufman of New York a member of the Council on Mental Health of the American Medical Association was appointed by the Chairman of the Council, Dr. Leo H. Bartemeier, as liaison member to the Council's new Committee.

Unlawful Practice.—The foreign letter from Canada entitled "Unlawful Practice Charge" (March 14 issue of THE JOURNAL, page 1225) states "For this purpose it was not required that he be licensed in the province (a step which would have involved an internship and examination)." This clause in parentheses is not true. An English physician who has been engaged by the Canadian Department of Indian Affairs to treat Indians, being a graduate of a British university and having his name on the General Register of the General Medical Council of the United Kingdom, would not have to do further internship before he could be licensed in this province. He simply has to furnish the College of Physicians and Surgeons of Ontario with certain information and/or documents, pay a small fee, and then write the Medical Council of Canada examinations.

EXAMINATIONS AND LICENSURE

NATIONAL BOARD OF MEDICAL EXAMINERS

National Board of Medical Examiners: Various Centers: Parts I and II, June 16-17; Part I only, Sept. 9-10. Examinations must be received at least six weeks in advance of a specific examination date. Examining centers established after close of registration. Exec. Sec., Dr. John P. Hubbard, 133 South 36th St., Philadelphia 4.

EDUCATIONAL COUNCIL FOR FOREIGN MEDICAL GRADUATES, INC.

Educational Council for Foreign Medical Graduates: Stations around the world, Sept. 22. Final date for filing application is June 22. Exec. Director, Dr. Dean F. Smiley, 1710 Orrington Ave., Evanston, Ill.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: *Written.* Montgomery, June 16-18. Sec., Dr. D. G. Gill, State Office Bldg., Montgomery 4.

ALASKA:* On application in Anchorage and Juneau. Sec., Dr. W. M. Whitehead, 172 South Franklin St., Juneau.

ARKANSAS:* *Examination and Reciprocity.* Little Rock, June 11-12. Sec., Dr. Joe Verser, Harrisburg.

CALIFORNIA: *Written.* San Francisco, June 15-18; Los Angeles, Aug. 17-20; Sacramento, October 19-22. *Oral.* San Francisco, June 13; Los Angeles, August 15; San Francisco, November 14. *Oral and Clinical.* San Francisco, June 14; Los Angeles, August 16; San Francisco, Nov. 15. Sec., Dr. Louis E. Jones, Room 536, 1020 N Street, Sacramento.

DELAWARE: *Examination.* Dover, July 14-16. *Endorsement.* Dover, July 23. Sec., Dr. Joseph S. McDaniel, Professional Bldg., Dover.

DISTRICT OF COLUMBIA:* *Written.* Washington, June 8-9. Final date for filing application is May 1. Sec., Dr. Daniel Leo Finucane, 1740 Massachusetts Ave., N. W., Washington.

FLORIDA:* *Examination.* Miami Beach, June 21-23. Sec., Dr. Homer L. Pearson, 901 N.W. 17th St., Miami 36.

GEORGIA: *Examination and Reciprocity.* Atlanta, June 10-11. Sec., Mr. C. L. Clifton, 224 State Capitol, Atlanta 3.

GUAM: *Subject to Call.* Act. Sec., Dr. F. L. Conklin, Agana.

HAWAII: *Written.* Honolulu, July 13-14. Sec., Dr. I. L. Tilden, 1020 Kapiolani St., Honolulu.

IDAHO: *Examination and Endorsement.* Boise, July 13. Exec. Sec., Mr. Armand L. Bird, 364 Sonna Bldg., Boise.

INDIANA: *Examination.* Indianapolis, June 17-19. Exec. Sec., Miss Ruth V. Kirk, 538 K. of P. Bldg., Indianapolis.

IOWA:* *Examination.* Iowa City, June 15-17. Exec. Sec., Mr. Ronald V. Saf, State Office Bldg., Des Moines 19.

KANSAS:* *Examination and Endorsement.* Kansas City, June. Sec., Dr. F. J. Nash, New Brotherhood Bldg., Kansas City.

KENTUCKY: *Examination.* Louisville, June 8-10. Sec., Dr. Russell E. Teague, 620 South Third St., Louisville 2.

LOUISIANA: *Examination and Reciprocity.* New Orleans, June 4-6. Sec., Dr. Edwin H. Lawson, 930 Hibernia Bank Bldg., New Orleans.

MARYLAND: *Examination.* Baltimore, June 23-26. Sec., Dr. Frank K. Morris, 1211 Cathedral St., Baltimore 1.

MICHIGAN:* *Examination.* Ann Arbor and Detroit, June 8-10. Sec., Dr. E. C. Swanson, 118 Stevens T. Mason Bldg., West Michigan Ave., Lansing 8.

MISSISSIPPI: *Examination and Reciprocity.* Jackson, June 22-24. Sec., Dr. A. L. Gray, Old Capitol, Jackson 13.

MISSOURI: *Examination.* St. Louis, May 29-30. Exec. Sec., Mr. John A. Hailey, Box 4, State Capitol Bldg., Jefferson City.

NEBRASKA:* *Examination.* Omaha, June 15-17. Director, Mr. Husted K. Watson, Room 1009, State Capitol Bldg., Lincoln 9.

NEW HAMPSHIRE: *Examination and Reciprocity.* Concord, Sept. 9-12. Sec., Dr. Edward W. Colby, 107 State House, Concord.

NEW JERSEY: *Examination.* Trenton, June 16-19. Sec., Dr. Royal A. Schaaf, 28 West State St., Trenton 8.

NEW MEXICO:* *Examination and Reciprocity.* Sante Fe, May *18-19. Sec., Dr. R. C. Derbyshire, 227 East Palace Ave.,* Santa Fe.

NEW YORK: *Examination.* New York, Rochester, Syracuse, Buffalo and Albany, June 23-26. Sec., Dr. Stiles D. Ezell, 23 S. Pearl St., Albany.

NORTH CAROLINA: *Written. Examination and Endorsement.* Raleigh, June 15-18. Sec., Dr. Joseph J. Combs, 716 Professional Bldg., Raleigh.

NORTH DAKOTA: *Examination and Reciprocity.* Grand Forks, July 8-11. Sec., Dr. C. J. Glaspel, Box 228, Grafton.

OHIO: *Examination.* Columbus, June 18-20. Sec., Dr. H. M. Platter, 21 West Broad St., Columbus 15.

OKLAHOMA:* *Examination.* Oklahoma City, June 2-3. Exec. Sec., Mrs. E. L. Haidek, 813 Braniff Bldg., Oklahoma City.

PENNSYLVANIA: *Examination and Endorsement.* Philadelphia and Pittsburgh, July 1-3. Sec., Mrs. Margaret G. Steiner, Box 911 Harrisburg.

PUERTO RICO: *Examination.* San Juan, Sept. 8. Sec., Dr. Joaquin Mercado Cruz, Box 9156, Santurce.

SOUTH CAROLINA: *Reciprocity.* Columbia, May 12; *Examination.* Columbia, June 23-24. Sec., Dr. H. E. Jervey, Jr., 1829 Blanding St., Columbia.

SOUTH DAKOTA:* *Examination.* Sioux Falls, Aug. 25-26. Exec. Sec., Mr. John C. Foster, 300 First National Bank Bldg., Sioux Falls.

TEXAS:* *Examination and Reciprocity.* Fort Worth, June 22-24. Sec., Dr. M. H. Crabb, 1714 Medical Arts Bldg., Fort Worth 2.

UTAH: *Examination and Reciprocity.* Salt Lake City, July 810. Dir., Mr. Frank E. Lees, 324 State Capitol Bldg., Salt Lake City 1.

VIRGINIA: *Examination.* Richmond, June 18-20. *Endorsement.* Richmond, June 17. Address: Board of Medical Examiners, 631 First St., S. W., Roanoke.

VIRGIN ISLANDS: *Examination.* Charlotte Amalie, St. Thomas, June 10. Chairman, Dr. Melvin H. Evans, Christiansted, St. Croix.

WASHINGTON:* *Examination.* Seattle, July 13-15. Administrator, Mr. Thomas A. Carter, Capitol Bldg., Olympia.

WEST VIRGINIA: *Examination.* Charleston, June. Sec., Dr. Newman H. Syer, State Office Bldg., No. 3, Charleston 5.

WISCONSIN:* *Written.* Milwaukee, July 14-16. *Reciprocity. Milwaukee, July 15. Sec., Dr. Thomas W. Tormey, Jr.,* 1140 State Office Bldg., Madison.

WYOMING: *Examination and Reciprocity.* Cheyenne, June 1. Sec., Dr. Franklin D. Yoder, State Office Bldg., Cheyenne.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARKANSAS: *Examination.* Little Rock, May 4-5. Sec., Dr. S. C. Dellinger, University of Arkansas, Fayetteville.

COLORADO: *Examination.* Denver, May 6-7. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver 18.

CONNECTICUT: *Examination.* New Haven, June 6. Exec. Asst. Mrs. Regina G. Brown, 258 Bradley St., New Haven 10.

DISTRICT OF COLUMBIA: *Examination.* Washington, May 18-19. Address: Mr. Paul Foley, Deputy Director, 1740 Massachusetts Ave., N. W., Washington.

FLORIDA: *Examination.* Miami, June 6. Sec., Mr. M. W. Emmel, University of Florida, Box 340, Gainesville.

KANSAS: *Examination.* Kansas City, June 2-3. Sec., Dr. L. C. Heckert, Pittsburg.

MICHIGAN: *Examination.* Ann Arbor and Detroit, May 8-9. Sec., Mrs. Anne Baker, West Michigan Ave., 116 Stevens T. Mason Bldg., Lansing.

NEBRASKA: *Examination.* Omaha, May 5-6. Director, Mr. R. K. Kirkman, Bureau of Examining Boards, 1009 State Capitol Bldg., Lincoln.

SOUTH DAKOTA: *Examination. Vermillion, June 5-6. Sec.,* Dr. Gregg M. Evans, 310 East 15th St., Yankton.

WASHINGTON: *Examination.* Seattle, July 8-9. Sec., Mr. Thomas A. Carter, Capitol Bldg., Olympia.

WISCONSIN: *Examination.* Milwaukee, June 6. Madison, Sept. 11. Sec., Dr. W. H. Barber, 621 Ransom St., Ripon.

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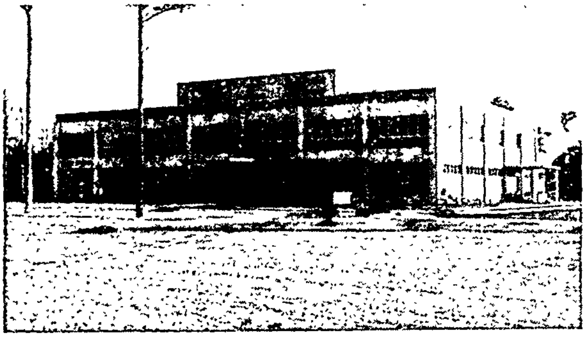
*Basic Science Certificate required.

GOVERNMENT SERVICES

AIR FORCE

Medical Officers Honored.—Col. Herbert W. Coone, U. S. A. F. (MC), was presented the Air Force Commendation Medal for meritorious service as Chief of Professional Services and Deputy Commander of the U. S. A. F. Hospital at Wiesbaden, Germany, from February, 1956, to December, 1958. During this period, the hospital underwent an unprecedented growth in workload and stature as the principal medical and surgical center for the United States Air Force in Europe. Doctor Coone was cited for his leadership and perseverance in improving the medical standards and for his conscientious research of preventive medicine and the community health program which resulted in an unprecedentedly low noneffective rate. Col. Ralph M. Lechausse, U. S. A. F. (MC), was presented the Legion of Merit for his meritorious performance of duty as Surgeon of Joint Task Force 7 during the 1958 nuclear tests in the Pacific. He was cited for his thorough investigation of possible exposure hazards to radiation resulting from nuclear tests and for creating and maintaining excellent international relationships in conducting such investigations.

New U. S. A. F. Hospital.—The new 50-bed U. S. A. F. Hospital at Myrtle Beach Air Force Base, S. C., was opened on March 1. This two-story, air-conditioned hospital offers outpatient service, including clinics in internal medicine, obstetrics, and surgery. Medical, surgical, and obstetrical facilities for inpatient care are located on the second floor. Col. Paul E. Lance, M. S. C., U. S. A. F., is commander of the hospital.



VETERANS ADMINISTRATION

Dr. Barnwell Honored.—The Veterans Administration's top award, the Exceptional Service award, was presented to Dr. John B. Barnwell, the agency's chief of medical research and education. Dr. Barnwell was cited for his part in organization of the VA-Armed Forces cooperative study of the chemotherapy of tuberculosis and for his leadership as VA assistant chief medical director for research and education. The VA-Armed Forces study, begun under Dr. Barnwell when he was chief of the VA tuberculosis service in 1946 and still continuing under that service, has played a large part in giving medicine modern drug treatments for tuberculosis.

Personal.—Dr. John M. Rumball, chief of medical service at the Veterans Administration hospital in Coral Gables, Fla., was appointed director of medical service for the agency in Washington, D. C., effective early in April. He also has accepted an appointment as clinical associate professor of medicine at Georgetown University School of Medicine in Washington, D. C.

FOOD AND DRUG ADMINISTRATION

Kelp Won't Help Your Diet.—Promoters of worthless products falsely represented as sources of additional vitamins and minerals in the diet and cures for disease continue to cheat the consumer and endanger his health. Each year, such promoters take from the American people large sums of money that could better be spent for wholesome, nutritious foods or competent medical advice. The Food and Drug Administration announced the seizure of 23,000 tablets of a so-called dietary supplement made with alfalfa, kelp, and brewer's yeast. The promoter claimed the tablets contained significant amounts of 14 vitamins, 10 minerals, and 14 proteins. His label carried an impressive-looking list of the amounts as measured in U. S. P. units. Agency analysts found the tablets did not contain amounts of vitamins, minerals, or proteins that could be measured in U. S. P. units. Kelp, one of the ingredients, is a source of iodine, which is already supplied in the diet. Alfalfa is a livestock feed. Brewer's yeast is used to make beer. Such ingredients do not prevent illness or generate health as claimed.

Pure Food Violations.—Tomato products and bulk wheat and rice continued to make up the largest volume of unfit foods removed from the market in February; 40 shipments totaling 886 tons of contaminated foods were seized. Of this amount, 293 tons of canned tomatoes in a single shipment were contaminated with fly eggs and maggots. More than 38 tons of other tomato products, including paste, puree, pizza sauce, catsup, and soup, contained spoiled tomatoes or fly eggs and maggots.

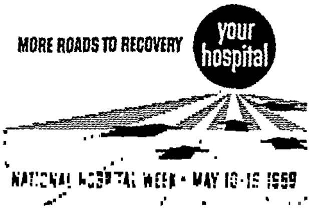
Two hundred ninety-six tons of wheat and rice were contaminated with rodent pellets, urine, hairs, and insect parts; 166 of the 179 tons of unfit warehoused foods was in rodent-contaminated chick peas (140 tons) and moldy, wormy, insect-damaged green coffee beans (26 tons) seized together in a New York warehouse.

An additional 58 tons of foods and 20,100 vitamin capsules were seized because of hazards to health. Included were 52 tons of mercury-contaminated wheat and 6 tons of an oil feed ingredient in which mineral oil had been substituted for edible oil. The vitamin product was deficient in vitamin B_1. Another 7 tons of foods seized as economic cheats included an instant chocolate flavored mix that was misbranded by false and misleading claims, an olive oil product in which teaseed oil was substituted for olive oil, and black pepper in which ground buckwheat hulls were substituted for black pepper. Of 10 drugs and devices seized in February, 3 were alleged to be misbranded by false and misleading claims. A medicated chest plaster was sold directly to parents as a four-day treatment for children's whooping cough, croup, spasmodic asthma, and hoarseness due to colds. Capsules of two prescription drugs—an amphetamine and a barbiturate—were substandard in rate of disintegration and drug content.

Truckdrivers Sentenced in Rotten Egg Racket.—Activities of the rotten egg combine continued in February despite numerous seizures and the threat of prison sentences hanging over key operators who are on probation. Egg shipments valued at $15,000 were seized at Eastern Seaboard cities from New York to Florida. On June 6 and 7, 1957, Food and Drug inspectors and state police followed a truckload of rotten eggs from central Maine, across New Hampshire, Massachusetts, and New York, and into New Jersey. For identification the inspectors had marked the eggs with an invisible crayon, which can only be seen under ultraviolet light. The driver reached speeds of 90 to 100 miles an hour during the 500-mile pursuit. Reaching Newark, N. J., ahead of his pursuers, he abandoned the truck and its cargo in a parking lot. Inspectors and U. S. Deputy Marshals maintained surveillance over the truck for five days before the marshal was able to serve seizure papers. The driver pleaded guilty to charges of interstate transportation of these eggs on Oct. 7, 1958. A day or two later he was reported to have made another pickup of rotten eggs at New England hatcheries. A week later he was apprehended in Vermont with a load of rotten eggs. At his sentencing, the court pointedly asked him if his family still ate eggs. On Feb. 13, 1959, the federal court at Newark, N. J., fined him $500 and placed him on probation for five years.

Pharmacists Convicted for Unauthorized Drug Refills.—A pharmacist-owner in Livingston, N. J., and a pharmacist-employee were convicted for unauthorized refilling of prescriptions for barbiturates and amphetamine. They dispensed up to four refills on the same prescription, voluntarily offering to double and triple the physician's recommended dosage and furnishing the increased amounts in subsequent refills. In one instance, a bottle of 100 capsules was sold as a refill of a prescription calling for only 12. The amount of money saved by purchasing drugs in large quantities was pointed out to Food and Drug inspectors, posing as customers. Federal Judge Thomas F. Meany (Newark, N. J.) said the temptation for extra profit in this case created a dangerous situation which could have fatal consequences. The court fined the owner a total of $3,000 on four counts and the employee $300 on one count.

Voluntary Corrective Actions.—Food manufacturers and warehousemen voluntarily spent a total of $96,985 during February in plant improvements suggested by agency inspectors to assure production of clean, wholesome products. A Pennsylvania baker eliminated possible insect contamination of his product at a cost of $35,000. He revamped his equipment for easy cleaning, stepped up his schedule of spraying for insects, and arranged to get regular advice on sanitation problems. A California olive oil producer spent $11,590 to correct insanitary practices in handling olives. A steam boiler, hopper, shaker screen and washing set-up, stainless steel holding tank, and special filter were among new items of equipment that he installed to process his raw materials more rapidly and keep them clean and unspoiled. Food firms voluntarily destroyed or converted to nonfood use more than 973 tons of unfit foods. Drug plants and warehouses voluntarily destroyed old and substandard drugs valued at $47,826.



DEATHS

Albright, George Carter Ⓜ Iowa City, Iowa; born in Pleasant Grove, Iowa in 1881; State University of Iowa College of Medicine, Iowa City, 1914; specialist certified by the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; served as vice-president of the Iowa State Medical Society; for 10 years president of the Johnson County Tuberculosis Association; in 1956 recipient of a medallion awarded by the Iowa Tuberculosis Association for his long and outstanding service to the group; past-president of the board of education; associated with the Mercy Hospital and the University Hospital, where he died Feb. 1, aged 77.

Alling, Marshall Louis Ⓜ Lowell, Mass.; Dartmouth Medical School, Hanover, N. H., 1909; fellow of the American College of Surgeons; veteran of World War I; served as medical examiner for the Middlesex North District; associated with St. Joseph's and Lowell General hospitals, and St. John's Hospital, where he died Feb. 8, aged 74.

Alspach, Walter Louis Ⓜ Miami, Fla.; University of Buffalo School of Medicine, 1918; associated with Mercy and Jackson Memorial hospitals; died Feb. 11, aged 64.

Ames, Sheppard Kellam Ⓜ Cape Charles, Va.; University of Virginia Department of Medicine, Charlottesville, 1925; interned at St. Joseph's Hospital in Baltimore; served overseas during World War I; member of the staff and board of trustees of the Northampton–Accomack Memorial Hospital in Nassawadox; died Jan. 30, aged 63.

Ausbrooks, Munch Trousdale, Smartt, Tenn.; University of Tennessee Medical Department, Nashville, 1895; postmaster; died in McMinnville Jan. 30, aged 88.

Baer, Raymond Bernhard Ⓜ Detroit; University of Chicago, The School of Medicine, 1931; specialist certified by the American Board of Obstetrics and Gynecology; veteran of World War I; clinical instructor in obstetrics and gynecology at Wayne University College of Medicine; associated with Receiving Hospital, St. Mary's Hospital, and Jennings Memorial Hospital, where he died Feb. 7, aged 59.

Barone, Samuel Ⓜ Buffalo, N. Y.; University of Buffalo School of Medicine, 1916; veteran of World War I; member of the American Academy of General Practice; on the staffs of the Deaconess and Lafayette General hospitals; died in the Millard Fillmore Hospital Jan. 29, aged 68.

Blount, Dillon Jefferson Jr. Ⓜ Mandeville, La.; University of Arkansas School of Medicine, Little Rock, 1946; member of the American Psychiatric Association; interned at the Charity Hospital of Louisiana in New Orleans; served a residency at the Veterans Administration Hospital in New Orleans; from 1946 to 1949 an officer in the medical reserve corps of the U. S. Army; formerly on the staff of the East Louisiana Hospital in Jackson; served on the staff of the Veterans Administration Hospital in Murfreesboro, Tenn.; superintendent of the Southeast Louisiana Hospital; died Jan. 28, aged 36.

Bolduc, Valmore Elmer, Nashua, N. H.; University of Vermont College of Medicine, Burlington, 1921; veteran of World War I; served as school physician; formerly city physician; on the staffs of St. Joseph's and Nashua Memorial hospitals; died Jan. 31, aged 61.

Bonar, Ethel Casto, Chicago; Western Reserve University School of Medicine, Cleveland, 1927; died Nov. 26, aged 65.

Boone, James Lunsford Ⓜ Green Cove Springs, Fla.; Vanderbilt University School of Medicine, Nashville, Tenn., 1917; specialist certified by the American Board of Otolaryngology; past-president of the Duval County Medical Association; veteran of World War I; on the staffs of the Baptist Memorial, St. Vincent's, St. Luke's, and Riverside hospitals in Jacksonville; died in Jacksonville Feb. 14, aged 64.

Bowers, James Michael Ⓜ Seattle; University of Michigan Medical School, Ann Arbor, 1925; fellow of the American College of Physicians; clinical assistant professor of medicine at the University of Washington School of Medicine; past-president of the Seattle Academy of Internal Medicine; veteran of World War II; on the staff of the Providence Hospital; died Feb. 9, aged 58.

Brackney, Edwin Leland Ⓜ Windermere, Fla.; the Hahnemann Medical College and Hospital, Chicago, 1915; served as a fellow in surgery and an instructor in surgery at the University of Minnesota Medical School in Minneapolis; later named assistant professor of surgery at the Medical College of Georgia in Augusta; served with the medical corps of the U. S. Army from 1947 to 1949 and from 1950 to 1952; died in Orlando Nov. 13, aged 70.

Ⓜ Indicates Member of the American Medical Association.

Browning, Lawrence T., Peach Creek, W. Va.; University of Louisville (Ky.) School of Medicine, 1926; died Feb. 3, aged 55.

Buckner, Doster Ⓜ Fort Wayne, Ind.; Indiana University School of Medicine, Indianapolis, 1919; member of the American Academy of General Practice; associated with Lutheran and Parkview Memorial hospitals; died Feb. 2, aged 66.

Bukowski, Edward Branislaus Ⓜ Buffalo, N. Y.; born in Buffalo Sept. 29, 1898; University of Buffalo School of Medicine, 1923; specialist certified by the American Board of Preventive Medicine; assistant professor of preventive medicine and public health, University of Buffalo School of Medicine; instructor of public health administration, Syracuse University, from 1941 to 1943; appointed health commissioner of the City of Buffalo in 1947 and in that position helped lay the groundwork for organization of the present Erie County Health Department which took over the city health department in 1948; appointed first deputy commissioner of the Erie County Health Department and held that office until appointed commissioner in April, 1955; died Feb. 21, aged 60.

Burghardt, Michael Ⓜ Brooklyn; Long Island College of Medicine, Brooklyn, 1931; fellow of the American College of Surgeons; veteran of World War II; associated with the Luther Medical Center, Norwegian Hospital, and Prospect Heights Hospital; died Jan. 10, aged 54.

Candela, Rolando Diaz Ⓜ Chicago; Universidad de la Habana Facultad de Medicina y Farmacia, Cuba, 1943; an officer in the medical reserve corps of the U. S. Army from Feb. 12, 1953 to April 30, 1956, interned at the Unity Hospital in Brooklyn; served a residency at the Adelphi Hospital, Brooklyn Women's Hospital, Prospect Heights Hospital, and the Caledonian Hospital, all in Brooklyn; died in the West Side Veterans Hospital Nov. 8, aged 39.

Carlisle, Patrick G., Connersville, Ind.; Central College of Physicians and Surgeons, Indianapolis, 1904; past-president of the Fayette County Board of Health; died in the Fayette Memorial Hospital Dec. 27, aged 80.

Carpenter, Robert Morse Ⓜ Stamford, Conn.; Chicago College of Medicine and Surgery, 1916; veteran of World War I; past-president of the Stamford Medical Society; president of the medical staff at Stamford Hospital and attending physician at St. Joseph's Hospital, where he died Feb. 7, aged 64.

Carpenter, William McNeill Ⓜ Greenville, S. C.; Johns Hopkins University School of Medicine, Baltimore, 1927; certified by the National Board of Medical Examiners; died Feb. 7, aged 56.

Cassidy, William J. Ⓜ Detroit; Detroit College of Medicine, 1908; also a pharmacist; past-president of the Wayne County Medical Society and of the Detroit Academy of Surgery; veteran of World War I; member of the Radiological Society of North America; fellow of the International College of Surgeons; served on the faculty of his alma mater; at various times associated with St. Mary's, Children's, Providence, Mount Carmel, Brent General, Holy Cross, and Delray General hospitals; staff physician for the *Detroit News;* died Feb. 11, aged 78.

Charbonnet, Louis Sr. Ⓜ New Orleans; Medical Department of Tulane University of Louisiana, New Orleans, 1901; for many years on the staff of the Hotel Dieu; died Feb. 3, aged 80.

Cheney, William Whittlesey, Fall City, Wash.; University of Michigan Homeopathic Medical School, Ann Arbor, 1892; also a pharmacist; served on the staff of the Nelems Memorial Hospital in Snoqualmie; died in Redmond Feb. 15, aged 91.

Cherwin, Nathan Hale Ⓜ Los Angeles; Columbia University College of Physicians and Surgeons, New York City, 1924; veteran of World War I; died in Las Vegas, Nev., Dec. 21, aged 59.

Christmann, Paul, Glendale, Calif.; American Medical Missionary College, Battle Creek, Mich., and Chicago, 1903; veteran of World War I; served on the staffs of the Behrens Memorial and Glendale hospitals; died in the Veterans Administration Hospital in Los Angeles Dec. 25, aged 79.

Clark, James Walker Ⓜ Durango, Colo.; University of Texas School of Medicine, Galveston, 1941; member of the American Academy of General Practice; served in the medical corps of the U. S. Naval Reserve during World War II; on the staff of the Mercy Hospital; died Feb. 4, aged 43.

Clark, William Henry G., St. Louis; Meharry Medical College, Nashville, Tenn., 1912; died in St. Mary's Infirmary Jan. 20, aged 84.

Cleveland, Frank Mortimer Ⓜ Philadelphia; Jefferson Medical College of Philadelphia, 1899; veteran of World War I; at one time on the faculty of Woman's Medical College of Pennsylvania; on the staff of the Presbyterian Hospital; died in Ambler, Pa., Jan. 29, aged 87.

Colantuono, Julius George Ⓜ Locust Valley, N. Y.; Albany (N. Y.) Medical College, 1946; certified by the National Board of Medical Examiners; specialist certified by the American Board of Psychiatry and Neurology; member of the American Psychiatric Association; veteran of World War II; lieutenant commander in the medical corps of the U. S. Naval Reserve from 1954 to 1956; on the staffs of the

Community Hospital in Glen Cove, Hillside Hospital, Glen Oaks, and Queen's General Hospital in Jamaica; died Feb. 4, aged 37.

Cooper, William Morris Ⓜ New York City; New York Homeopathic Medical College and Flower Hospital, New York City, 1921; fellow of the American College of Surgeons; formerly adjunct professor of surgery at New York Polyclinic Medical School and Hospital; served on the staffs of the Midtown and St. Clare's hospitals; died Feb. 16, aged 64.

Cornell, Howard Merritt, Albuquerque, N. M.; Kansas City (Mo.) Medical College, 1892; formerly associated with the Indian Service; died in St. Margaret's Hospital, Montgomery, Ala., Feb. 2, aged 88.

Crowe, John Alexander Ⓜ San Francisco; Creighton University School of Medicine, Omaha, 1931; interned at Southern Pacific General Hospital; associated with St. Mary's Hospital, where he died Dec. 20, aged 54.

Curl, Robert Bruce, Toledo, Ohio; Eclectic Medical College, Cincinnati, 1916; served overseas during World War I; formerly associated with the city board of health and the board of education; on the staffs of the Flower and St. Luke's hospitals; died in the Veterans Administration Hospital, Dearborn, Mich., Jan. 29, aged 81.

Darche, Albert A. Ⓜ Westbrook, Maine; Laval University Faculty of Medicine, Quebec, Que., Canada, 1919; served with the Canadian Army during World War I; died in Portland Jan. 13, aged 63.

Davis, Frederick Upham, Fairbault, Minn.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1902; served as health officer of Faribault; veteran of the Spanish-American War; for many years served as the head of the Rice County Selective Service Board; a charter member of the Faribault Chapter of Rotary International and served as the second president of that organization; area council president of the Boy Scouts of America, and was the recipient of the Silver Beaver Award for distinguished service to boyhood; on the staff of St. Lucas Deaconess Hospital; died Jan. 23, aged 83.

De Motte, Roy James Ⓜ Chicago; Rush Medical College, Chicago, 1912; fellow of the American College of Surgeons; on the staff of the Roseland Community Hospital; for many years chief surgeon for the Pullman Standard Car Manufacturing Company; died Feb. 16, aged 77.

Dolan, Martin Aloysius Ⓜ Chicago; Loyola University School of Medicine, Chicago, 1932; associated with the Little Company of Mary, St. George, and Cook County hospitals; died Feb. 19, aged 51.

Eckert, M. Milton Ⓜ New York City; Long Island College Hospital, Brooklyn, 1911; member of the Association of Military Surgeons of the United States; veteran of World War I; died Jan. 11, aged 70.

Eichert, Herbert Ⓜ Miami, Fla.; born in Baltimore May 28, 1907; University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore, 1932; specialist certified by the American Board of Internal Medicine; fellow of the American College of Physicians; member and past-vice-president of the American College of Cardiology; past-vice-president of the Florida Heart Association; past-president of the Miami Heart Association; clinical associate professor of internal medicine at the University of Miami School of Medicine in Coral Gables, where he was past-secretary of the medical board; veteran of World War II; past-director of cardiology at Jackson Memorial Hospital and chief of staff of the National Children's Cardiac Home; chief of medicine at Mercy Hospital; since 1949 consultant in cardiology at the Veterans Administration; died Feb. 2, aged 51.

Fagin, Joseph Ⓜ Long Beach, Calif.; Long Island College of Medicine, Brooklyn, 1938; interned at the Greenpoint Hospital in Brooklyn; served a residency in obstetrics and gynecology at Henry Ford Hospital in Detroit; specialist certified by the American Board of Obstetrics and Gynecology; member of The Endocrine Society; director of medical research at Ciba Pharmaceutical Company during 1940-1944; associated with St. Mary's Community, and Seaside Memorial hospitals; died Dec. 9, aged 55.

Faragher, James Lawrence Ⓜ Cleveland; Western Reserve University School of Medicine, Cleveland, 1913; fellow of the American College of Surgeons; associated with Marymount Hospital in Garfield Heights, St. Vincent Charity Hospital and St. Alexis Hospital, where he died Feb. 6, aged 69.

Fellows, Walter Lesley, Philadelphia; Hahnemann Medical College of Philadelphia, 1904; died Jan. 14, aged 80.

Franklin, Wellington August, Kinmundy, Ill.; John A. Creighton Medical College, Omaha, 1896; died in Manhattan Beach, Calif., Jan. 1, aged 85.

Galloway, Quince Rudolph Ⓜ Livermore, Calif.; University of Nashville (Tenn.) Medical Department, 1906; died Jan. 29, aged 87.

Gardner, Wray Rodgers Ⓜ Denver; University of Colorado School of Medicine, Denver, 1930; member of the American Psychiatric Association; clinical instructor in psychiatry at his alma mater; past-secretary of the Colorado Neuropsychiatric Society; served as director of mental health for the Colorado

State Public Health Department; veteran of World War II; associated with Mount Airy Hospital; on the staffs of General Rose Memorial, St. Luke's, and St. Joseph's hospitals; died Jan. 28, aged 54.

Glenn, Grover Cleveland Ⓜ State College, Pa.; Eclectic Medical College of the City of New York, 1912; veteran of World War I; died in the Bloomsburg (Pa.) Hospital Jan. 25, aged 72.

Lussier, Joseph Hermenegilde, Springfield, Mass.; Boston University School of Medicine, 1922; interned at the Massachusetts Homeopathic Hospital in Boston; fellow of the American College of Surgeons; veteran of World War I; for many years on the staff of the Mercy Hospital, where he died Jan. 30, aged 61.

McGill, Caroline Ⓜ Gallatin Gateway, Mont.; Johns Hopkins University School of Medicine, Baltimore, 1914; past-president of the Silver Bow County Medical Society; formerly practiced in Butte, where she was on the staff of the Murray Hospital; in October, 1955, was named "Woman of the Year" by the Butte Business and Professional Women's Club; in 1955 awarded an honorary doctor of science degree at Montana State College in Bozeman; died Feb. 4, aged 79.

Miller, James Patton Ⓜ Baltimore; Columbia University College of Physicians and Surgeons, New York City, 1940; specialist certified by the American Board of Orthopaedic Surgery; member of the American Academy of Orthopaedic Surgeons; fellow of the American College of Surgeons; veteran of World War II; assistant instructor of pathology at the University of Pennsylvania School of Medicine in Philadelphia, 1940-1941; assistant professor of orthopedic surgery at Johns Hopkins University School of Medicine; associated with Johns Hopkins Hospital and James Lawrence Kernan Hospital for Crippled Children; died Feb. 1, aged 45.

Moore, Milton H., Dearborn, Mo.; Ensworth Medical College, St. Joseph, 1896; served three terms as mayor of Dearborn and coroner of Platte County; died in Missouri Methodist Hospital in St. Joseph Jan. 27, aged 87.

Newman, William Manning Ⓜ Spokane, Wash.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1901; formerly county health officer; honorary staff member of Deaconess, Sacred Heart, and St. Luke's hospitals; died Jan. 11, aged 87.

Patterson, John Norman Ⓜ Burlington, Iowa; Queen's University Faculty of Medicine, Kingston, Ont., Canada, 1890; died Jan. 7, aged 94.

Pearson, Fray Owen Ⓜ Macon, Ga.; Vanderbilt University School of Medicine, Nashville, Tenn., 1929; regional director of public health for the state of Georgia; served as director of the Chattanooga-Hamilton County (Tenn.) Health Department; formerly on the staff of the Knoxville, Tenn., health department; died Jan. 9, aged 55.

Pease, Willard A., Rio, Wis.; Wisconsin College of Physicians and Surgeons, Milwaukee, 1902; died in Waterloo Jan. 24, aged 82.

Perkins, Robert Donald Ⓜ Moline, Ill.; Rush Medical College, Chicago, 1935; member of the American Urological Association; fellow of the American College of Surgeons; during World War II served overseas in the European Theater for three years; associated with St. Anthony Hospital in Rock Island and the Lutheran Hospital; past-president of the medical staff and chairman of the executive committee of the Moline Public Hospital, where he died Dec. 31, aged 49.

Phillips, Julius Andrew, Minden, La.; Meharry Medical College, Nashville, Tenn., 1927; secretary of the Keystone Life Insurance Company; medical director of the Phillips Hospital, of which he was the owner; died Jan. 12, aged 62.

Pinson, Charles Campbell Ⓜ San Antonio, Texas; University of Texas School of Medicine, Galveston, 1926; fellow of the American College of Surgeons; associated with the Baptist Memorial and the Robert B. Green Memorial hospitals, and the Santa Rosa Hospital, where he died Jan. 1, aged 59.

Projector, Harry Ⓜ Washington, D. C.; University and Bellevue Hospital Medical College, New York City, 1913; for many years practiced in New York City, where he was on the staff of the Bronx Hospital; died Jan. 29, aged 74.

Propst, Duane Willard Ⓜ Chicago; University of Illinois College of Medicine, Chicago, 1919; formerly on the faculty of his alma mater; author of "The Patient Is the Unit of Practice"; died in the Presbyterian-St. Luke's Hospital Feb. 2, aged 67.

Rader, John Franklin Ⓜ Houston, Texas; University of Texas School of Medicine, Galveston, 1926; veteran of World War I; co-founder of the Parkview Hospital, where he died Jan. 27, aged 61.

Reis, Abilio Gomez da Silva Ⓜ Piedmont, Calif.; Universidade de Lisboa Faculdade de Medicina, Portugal, 1919; fellow of the International College of Surgeons and the American College of Surgeons; member of the staff of the Peralta Hospital in Oakland; died Feb. 1, aged 66.

Ritenour, Almer Daniel Ⓜ Jamestown, Ohio; University of Cincinnati College of Medicine, 1922; served as president of the Greene County Board of Health; associated with the Greene Memorial Hospital in Xenia, where he died Jan. 24, aged 69.

Rosenberg, Lionel, Brooklyn; Long Island College Hospital, Brooklyn, 1907; specialist certified by the American Board of Internal Medicine; associate clinical professor of medicine at the New York Medical College, Flower and Fifth Avenue Hospitals, New York City; died Feb. 6, aged 75.

Rosenstein, Harry, New York City; Fordham University School of Medicine, New York City, 1917; served overseas during World War I; on the staffs of the Misericordia Hospital and the Lebanon Hospital, where he died Jan. 30, aged 66.

Rossow, Russell Julius Ⓜ Evansville, Ind.; Washington University School of Medicine, St. Louis, 1939; member of the American Academy of General Practice; past-treasurer of the Vanderburgh County Medical Society; past-president of the Baptist Hospital staff; died in the Vanderbilt University Hospital, Nashville, Tenn., Jan. 10, aged 56.

Rowley, Philip William, Dunedin, Fla.; Tufts College Medical School, Boston, 1918; formerly practiced in Gloucester, Mass., where he was on the staff of the Addison Gilbert Hospital; died in the Mease Hospital Jan. 17, aged 65.

Ruoff, Andrew C. Ⓜ Union City, N. J.; Fordham University School of Medicine, New York City, 1917; also a lawyer; taught medical jurisprudence at John Marshall College; on the courtesy staff of the North Hudson Hospital; died in the Doctors Hospital in New York City Jan. 21, aged 65.

Savage, Francis Joseph Ⓜ St. Paul, Minn.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1901; past-president of the Minnesota State Medical Association and the Ramsey County Medical Society; from 1940 to 1947 member of the House of Delegates of the American Medical Association; fellow of the American College of Surgeons; veteran of World War I; associated with St. Luke's Hospital; for many years a surgeon for the Great Northern Railway; died Jan. 16, aged 83.

Schilback, Harold Fenwick, New Milford, Conn.; Long Island College of Medicine, Brooklyn, 1932; specialist certified by the American Board of Ophthalmology; formerly practiced in Brooklyn, where he was on the staffs of the Brooklyn Eye and Ear Hospital and Long Island College Hospital; on the staff of the New Milford Hospital; died in New Haven Hospital Jan. 14, aged 58.

Schoonmaker, Guy Daniel Ⓜ San Francisco; Vanderbilt University School of Medicine, Nashville, Tenn., 1917; member of the American Academy of General Practice; died Jan. 14, aged 67.

Schrup, Joseph Henry Ⓜ Dubuque, Iowa; Northwestern University Medical School, Chicago, 1904; veteran of World War I; associated with Finley and St. Joseph Mercy hospitals; died Jan. 10, aged 76.

Seeley, Isaac Flood, Tucson, Ariz.; Keokuk (Ia.) Medical College, College of Physicians and Surgeons, 1904; died in Tucson Medical Center Jan. 3, aged 77.

Seidelmann, Otto Frank Ⓜ Chicago Heights, Ill.; Chicago Medical School, 1941; veteran of World War II; associated with St. James Hospital, where he died Jan. 29, aged 44.

Sekiyama, Isami Ⓜ Los Angeles; Tohoku Imperial University Medical Faculty, Sendai, Japan, 1915; died Jan. 19, aged 67.

Shearer, Amon Robert Ⓜ Mont Belview, Texas; University of Texas School of Medicine, Galveston, 1898; past-president of the Liberty–Chambers Counties Medical Society; assistant county health officer; died in the Polk County Hospital, Livingston, Jan. 16, aged 87.

Sherard, Stuart Baskin Ⓜ Gaffney, S. C.; University of Maryland School of Medicine, Baltimore, 1905; past-president of the Cherokee County Medical Society; associated with the Cherokee County Memorial Hospital; died Jan. 2, aged 79.

Sherwood, William Davies Ⓜ New York City; Columbia University College of Physicians and Surgeons, New York City, 1906; specialist certified by the American Board of Psychiatry and Neurology; served in France during World War I; formerly on the faculty of the New York Post-Graduate Medical School, Columbia University; fellow of the Academy of Compensation Medicine and the New York Society for Clinical Psychiatry; associated with the University and Willard Parker hospitals died Feb. 1, aged 76.

Simons, Harold R., San Francisco, Calif.; Loyola University School of Medicine, Chicago, 1929; specialist certified by the American Board of Ophthalmology; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the International College of Surgeons; resigned from the regular Navy in 1931; veteran of World War II; on the staff of Greens' Eye Hospital; chief, department of ophthalmology, Kaiser Foundation Hospital, where he died Jan. 13, aged 56.

Slosser, Dyle Jason Ⓜ Defiance, Ohio; Starling–Ohio Medical College, Columbus, 1913; member of the House of Delegates of the American Medical Association in 1946; since 1945 coroner of Defiance County; past-president of the Ohio Coroners Association and the Defiance County Medical Society, which he also served at one time as secretary; formerly secretary of the Northwestern Ohio Medical Society; member of the American Academy of General Practice; served during World War I; on the staff of the Defiance Hospital; died Jan. 15, aged 75.

Snyder, William Joseph Kline Ⓜ Avalon, Pa.; Bellevue Hospital Medical College, New York City, 1895; served as president of the school board; for many years associated with the Suburban General Hospital in Bellevue, which he helped organize; a founder, and for many years president and chairman of the board, Avalon Bank; died Jan. 20, aged 94.

Spinner, Samuel Leonard Ⓜ Elizabeth, N. J.; L.M.S., & M.A.S., England, 1917; veteran of World War I; on the staff of the Newark Beth Israel Hospital; died in Elizabeth General Hospital Jan. 20, aged 68.

Stangland, Arthur K. Ⓜ Highland, Ind.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1905; associated with the West Surburban Hospital in Oak Park, Ill.; died Jan. 27, aged 78.

Staniford, Kenneth Jamison Ⓜ Bass Lake, Calif.; Cooper Medical College, San Francisco, 1911; past-president of the Fresno County Medical Society; served on the Fresno County Board of Health; was a member of the city parks commission; veteran of World War I; died Jan. 25, aged 69.

Stauffer, Leslie John Ⓜ Bothell, Wash.; Northwestern University Medical School, Chicago, 1910; member of the American Academy of General Practice and the Industrial Medical Association; formerly associated with the Indian Service; died Jan. 19, aged 74.

Stayton, Howard Nehemiah Jr. Ⓜ Newark, Del.; University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore, 1940; plant physician of the Chrysler Corporation for seven years; formerly member of the state board of health; at one time practiced in Lewes, where he served on the staff of the Beebe Hospital; died Jan. 23, aged 44.

Stoumen, Samuel Ⓜ Bethlehem, Pa.; Maryland Medical College, Baltimore, 1911; served as deputy coroner of Northampton County; on the staff of St. Luke's Hospital, where he died Feb. 4, aged 71.

Swanson, Cleary Neil Ⓜ Detroit; Harvard Medical School, Boston, 1923; clinical assistant professor of obstetrics and gynecology at Wayne University College of Medicine; specialist certified by the American Board of Obstetrics and Gynecology; member of the Central Association of Obstetricians and Gynecologists; fellow of the American College of Surgeons; past-president of the Michigan Society of Obstetricians and Gynecologists and the Michigan Obstetrical Society; associated with the Highland Park (Mich.) General Hospital; for many years head of the department of obstetrics and gynecology at Mount Carmel Mercy Hospital, where he died Jan. 21, aged 61.

Swinney, Roy Goldson, Richland, Iowa; Keokuk (Iowa) Medical College, College of Physicians and Surgeons, 1905; past-president of the Keokuk and Jefferson Counties Medical societies; for many years member of the school board; for a time chief of the medical staff at the Jefferson County Hospital in Fairfield; during World War II served in the state guard; died in the Ottumwa (Iowa) Hospital Jan. 2, aged 77.

Thompson, William Augustas Ⓜ Citronelle, Ala.; University of Tennessee Medical Department, Nashville, 1904; member of the American Academy of General Practice; served as mayor; died Jan. 21, aged 75.

Tint, Louis Jacob Ⓜ Chicago; Jefferson Medical College of Philadelphia, 1908; member of the American Academy of General Practice; veteran of World War I; died in the Albert Merritt Billings Hospital Feb. 3, aged 79.

Vail, George Francis, Hartford, Conn.; University of Pennsylvania Department of Medicine, Philadelphia, 1902; associated with McCook Memorial and St. Francis hospitals, and the Hartford Hospital, where he died Jan. 8, aged 80.

Vassey, Thomas, Trenton, N. C.; University of Tennessee College of Medicine, Memphis, 1938; served an internship at the Norfolk General Hospital in Norfolk, Va., and a residency at the Leigh Memorial Hospital in Norfolk, Va., died Jan. 1, aged 47.

Ward, Edward, Flushing, N. Y.; Jefferson Medical College of Philadelphia, 1923; served on the staff of the Flushing Hospital; died Jan. 5, aged 59.

Webb, Byford Hodgen Ⓜ West Frankfort, Ill.; St. Louis University School of Medicine, 1906; veteran of World War I, serving with the American Expeditionary Forces in Europe; died in the Franklin Hospital, Benton, Jan. 21, aged 77.

Webster, Howard Hamilton, Dayton, Ohio; Hahnemann Medical College and Hospital of Philadelphia, 1903; died Jan. 24, aged 78.

Whitmore, William Harvey Ⓜ Captain, U. S. Navy, retired, Norfolk, Va.; University of Virginia Department of Medicine, Charlottesville, 1916; entered the Navy in 1917 and retired July 1, 1938; veteran of World Wars I and II; past-president of the Radiological Society of Virginia; on the staffs of the Norfolk General and De Paul hospitals; died Jan. 30, aged 66.

Woodward, Lee Roy Ⓜ Mason City, Iowa; Rush Medical College, Chicago, 1917; specialist certified by the American Board of Internal Medicine; fellow of the American College of Physicians; past-president of the Iowa State Medical Society; on the staff of the Park Hospital, where he died Dec. 9, aged 73.

FOREIGN LETTERS

BRAZIL

Tuberculous Meningitis.—João Batista dos Reis and co-workers of the University of São Paulo (*O Hospital*, vol. 55, January, 1959) compared the results of treatment in 14 patients who had tuberculous meningitis with those in an earlier series of 16 patients who were successfully treated with systemic and intrathecal doses of streptomycin. In the earlier series spinal fluid examinations were performed monthly during the whole treatment. None of the patients developed serious neurological or psychiatric complications. In the later series, in addition to streptomycin, the patients were given isoniazid and ACTH. In the second group the fibrin clot was absent from the spinal fluid in the 6th month as compared to the 14th month in the first group; the cell count became normal in the 8th month as compared to the 14th month in the first group; the protein level became normal in the 5th month as compared to the 10th month in the first group; and the sugar level became normal in the 4th month as compared to the 6th month in the first group. These findings demonstrated the value of adding isoniazid and ACTH to the therapeutic regimen.

DENMARK

Ornithosis-Related Antigens.—Soluble ornithosis-related antigens were obtained from 22 of 30 strains of Bacillus anitratum by Volkert and Matthiesen (*Acta path. et microbiol. scandinav.* 44:278-286, 1958). Antigen-antibody analyses with these antigens and five representative human ornithosis serums revealed certain differences in both the quality of the antigens and the antibodies. Ornithosis antigens and antigens from selected bacterial strains were tested against 172 human ornithosis serums, and 96% of the serums gave positive complement-fixation tests with all antigens. In 89% equal antibody titers were obtained. The ornithosis-related antigens were also tested with 500 ornithosis-negative serums originating from patients suffering from acute infectious diseases. Of these 3% gave positive complement-fixation reactions with the bacterial antigen only. The problem of false-positive serum reactions due to the use of B. anitratum antigen in the diagnostic tests for ornithosis is still unsolved, and until this has been investigated further the practical value of the B. anitratum antigen cannot be determined.

Vitamin B_{12} Deficiency in Anemia.—Determination of the vitamin B_{12} level in plasma was performed on 40 patients with uncharacteristic macrocytic anemia, whose marrow did not contain typical megaloblasts but a varying number of large erythroblasts or macroblasts and who exhibited, in most cases, maturation disturbances of the myelopoietic system in the form of large metamyelocytes and large hypersegmented neutrophils. This was reported by Kristensen and Gormsen (*Acta med. scandinav.* 162:415-422, 1958). Abnormally low plasma concentrations of the vitamin were common among these patients. Broadly speaking, there was agreement between the degree of the marrow changes and the plasma vitamin B_{12} level, abnormally low levels being found in all patients whose marrow contained numerous giant cells, whereas among the group whose marrow contained only occasional giant cells the level was abnormally low in some and normal in others. Patients with a low plasma vitamin B_{12} concentration responded to parenteral administration of the vitamin.

The study showed that low vitamin B_{12} levels in the plasma, reflecting a deficiency of the vitamin, might be present although the marrow revealed no cells that could be definitely designated as megaloblasts. This supported the assumption that the finding of large metamyelocytes and hypersegmented neutrophils (pernicious anemia neutrophils) in the marrow may be an early histological sign of pernicious anemia. The authors pointed out the significance of being able to make a diagnosis of vitamin B_{12} deficiency before typical changes have appeared in the blood or marrow.

Reserpine for Hypertension.—A. R. Krogsgaard (*Acta med. scandinav.* 162:449-463, 1958) used reserpine to treat 75 patients with benign essential hypertension, the maintenance dose being about 0.5 mg. daily in most cases. In 39 of these treatment was supplemented later by hydralazine, the maximum dose being 400 mg. daily. To elucidate the frequency of the initial side-effects of hydralazine with and without preceding administration of reserpine, 24 patients were treated with hydralazine alone. Reserpine as the only form of treatment gave a satisfactory result (fall in the mean blood pressure of 20 mm. Hg at least and of 140 mm. Hg at most, and abatement of reversible eyeground changes) in 11 of 75 patients. In these 11 patients the blood pressure fell on the average from 209/123 to 161/93 mm. Hg. When a placebo was given after an average duration of treatment

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The items in these letters are contributed by regular correspondents in the various foreign countries.

of 15.7 months, the mean blood pressure rose by 20 to 37 mm. Hg in six patients but did not change significantly in the remaining five.

Most of the patients who responded satisfactorily to reserpine alone had a less severe hypertension than the others in the series. When reserpine was given prior to and simultaneously with hydralazine fewer side-effects of the latter were seen, and more patients were able to complete the treatment. Furthermore a more rapid rise in the dose of hydralazine became possible. Of the 39 patients treated with reserpine and hydralazine 20 completed the treatment satisfactorily. In these patients the blood pressure fell on the average from 225/127 to 181/97 mm. Hg. When a placebo was given after an average period of combined treatment of 29.5 months, the mean blood pressure rose by 20 to 24 mm. Hg in three patients, by 10 to 19 mm. Hg in eight, and did not change significantly in the remaining nine.

The authors concluded that reserpine as the only form of treatment produced a satisfactory result in a small proportion of patients with benign hypertension, chiefly in the milder forms. In the rest of the patients reserpine might form a valuable basis for combined treatment with hydralazine. After prolonged treatment the administration of reserpine might be tentatively discontinued, as about half the patients would then be able to dispense with this drug.

In the same issue Krogsgaard described the side-effects of reserpine in 36 patients treated with reserpine alone and 39 treated with reserpine combined with hydralazine. Side-effects of reserpine treatment occurred in 60 of the patients. They were insignificant in most cases (nasal congestion, diarrhea, and fatigue) and tended to subside with continued treatment, but in 20 patients treatment had to be discontinued because of edema or other undesirable side-effects. A weight gain occurred in 26 patients amounting maximally to 16.8 kg. (37 lb.) and averaging 7.2 kg. (16 lb.). In only one patient did the increase in weight necessitate discontinuance of treatment. In the course of continued treatment the weight fell again in some of the patients and after cessation of the treatment in most. Mental depression was the severest side-effect, seen in 13 patients. Treatment with reserpine was discontinued in 12 of these. In one patient the mental depression led to suicide. Two patients had to be admitted to psychiatric wards and one of these committed suicide one year later. The patients who developed mental depression had a higher frequency of previous depression than the other patients or had a familial predisposition to this. The dose of reserpine given to the depressed patients often exceeded 1 mg. daily. Pronounced depression in a patient or in his family constituted a contraindication to ambulant treatment with reserpine.

Occupational Allergy.—From 1944 to 1956 4,348 allergic patients suffering from bronchial asthma, vasomotor rhinitis, or angioneurotic edema were examined at the Allergic Clinic, Copenhagen, by Bruun and Lorenzen (*Acta allergol.* 12:432-440, 1958). The authors assumed the following criteria for allergic diseases of occupational origin: (1) the allergic disease must not have been present prior to the work that is considered injurious, (2) the symptoms must chiefly appear during work and always be most pronounced at the place of work, and (3) the patient's condition must improve materially when he is off duty for prolonged periods as, for instance, during holidays. Judging by these criteria 281 patients (6.5%) were found to be suffering from occupational allergy.

New Succinimide for Epileptics.—Trolle and Kiørboe (*Nord. med.* 60:1780-1782 [Dec. 11] 1958) treated 38 patients who had petit mal seizures with PM 680 for periods averaging eight months; 14 became seizure-free, 17 had 50 to 99% reduction in seizure frequency, and 7 showed no improvement. Thirty patients had typical petit mal seizures and only three of these did not react to the treatment. Of six patients with myoclonic fits two became seizure-free, two had clinical improvement, and two did not respond to treatment. Two patients with atypical loss of consciousness showed no improvement. The drug was not given to patients with typical psychomotor epilepsy. In several patients it was found to be superior to both phensuximide and oxyphenbutazone, and side-effects were less frequent.

Treatment of Necrotic Lesions.—Storm and Hilmer-Nielsen (*Nord. med.* 60:1831-1834 [Dec. 18] 1958) used stabilized crystalline trypsin as a powder aerosol on 10 patients with large necrotic lesions and observed a rapid resolution of the necrotic tissue in five or six days. It was impossible to say anything about the course of illness in these patients if the lesions had been treated by other means, but in most of the patients other treatments had been tried without benefit before the trypsin therapy. The two patients in whom the trypsin therapy partially failed had extremely low healing tendencies because of their poor general condition and local nutritional disturbances.

Serum Transaminase Activity.—In 120 patients serial determinations of serum glutamic oxalacetic transaminase and glutamic pyruvic transaminase levels were made and reported on by Ersbak (*Nord. med.* 61:49-54 [Jan. 1] 1959). The possibilities of a more differentiated clinical interpretation were examined on the basis of the curve patterns. The serial determinations of the two transaminases simultaneously demonstrated characteristic changes diagnostic of coronary infarction, metastases to the liver, chronic liver disease, acute parenchymatous liver disease, and occlusive liver disease. Although variations from the characteristic pattern might be seen, serial determinations of the activity of the transaminases were considered to be of greater value than single determinations.

Rubella and Pregnancy.—There has been a marked rise in the incidence of rubella in Denmark. In the period 1950-1952 about 6,000 cases were reported and in 1955, there were 54,815. Because of the risk of malformations in children whose mothers had had rubella at an early stage of their pregnancies, Jacobsen and Christensen of the Odense general hospital (*Ugeskrift for læger*, Jan. 8, 1959) sent a questionnaire to physicians to ascertain the frequency of such malformations. They found that 43 pregnancies had been complicated by rubella, and that among the 32 women whose rubella had occurred within the first 16 weeks of pregnancy 19 had given birth to healthy children and 8 had aborted. In several cases confinement had been normal, but the infants presented such malformations as heart disease, cataract, or defective dental enamel.

Among the 23 women for whom abortion had been induced on account of rubella, 5 had wished to have a child but had been so alarmed by the prospect of malformations that they wished to sacrifice it. Among the 5,400 abortions induced in Denmark in 1955 there were 406 for whom this was done on account of rubella. Jacobsen and Christensen concluded that if rubella occurs in the early months of pregnancy, and if the mother desires the termination of her pregnancy on this account, this wish should be granted. They suggested that, in order to get more statistical information on the subject, under the heading "rubella" in the weekly list of reportable diseases there should be a subheading to be filled in with the coincidence of pregnancy and its duration at the onset of the rubella.

Cancer of the Rectum.—In the 10-year period 1946-1955, there were 180 cases (112 in men and 68 in women) of cancer of the rectum in Aarhus (population of 113,000). These cases were reported on in the *Danish Medical Bulletin* for December, 1958, by Dr. N. Blixenkrone-Möller who calculated that these cases represented an average of one such case per year for every 6,280 persons. Up to the age of 60, the disease was equally distributed between the sexes, but after this age there was a steep rise in men but not in women. In 70% the tumor was situated at most 10 cm. above the anus and could therefore be reached by the exploring finger.

Among the 170 patients whose tumors were examined microscopically, 158 tumors were adenocarcinomas, 6 were solid carcinomas, 5 were malignant papillomas, and 1 was a lymphosarcoma. The tumors were regarded as inoperable in 55 of the total instances and as operable in the remaining 125. Major operations were performed in 78%. Five years after the diagnosis, 31% of the operable patients were still alive. Of the operable patients who underwent rectal resection, 37% were alive five years later. The prognosis proved to be better for those whose symptoms had existed for more than three months than for those with an interval shorter than three months. The author concluded that it was desirable to use a more extensive removal of pelvic connective tissue and perineal skin that has so far been the practice, especially in low-level cancers of the rectum.

Artery Transplantations.—At a meeting of the Jydsk Medicinsk Selskap, reported in *Nordisk medicin* for Feb. 12, Jakobsen and co-workers reported a series of 41 patients on whom arteries had been transplanted at the Aarhus general hospital since 1955. They had been selected from among the 97 patients subjected to arteriography with the possibility in mind of transplantation for the relief of intermittent claudication, pain, necrosis, or gangrene. Most of them had arterial obstruction of the lower limbs, but nine had such an obstruction of the abdominal aorta. In 7 the symptoms had existed for less than six months, and in 14 for over five years. Most were between the ages of 50 and 60, and one was over 80. The grafts had been taken from the young and healthy victims of fatal accidents, seldom more than six to eight hours after death. Among the 38 survivors of the transplantations, 31 were cured or much improved, but, until the complication rate can be effectively reduced, the indications for transplantation must be imperative, the mere arteriographic demonstration of an obstruction being no call for it in the absence of symptoms.

Public Health Data.—Dreyer and Frandsen (*Danish Medical Bulletin*, January, 1959) reviewing the statistical reports for 1956 and 1957 found that the behavior of the reportable diseases was rather erratic, with an increase in influenza from 115,203 in 1956 to 544,613 in 1957. On the other hand the incidence of poliomyelitis fell from 191 (37 paralytic and 154 nonparalytic) in 1956 to 26 (10 paralytic and 16 nonparalytic) in 1957. In neither year was a single case of diphtheria reported. Since 1954 there has been a slight fall in the incidence of gonorrhea, but the figure for 1957 of 7,447 cases is relatively high. About half this number were reported in Copenhagen. The infant mortality continued to fall with 25.2 deaths per 1,000 live births in 1955 and 23.4 in 1957. The two leading causes of death, malignant growths and degenerative cardiovascular disease, accounted for 46% of all the deaths in 1957. The tuberculosis mortality was down in this year to 4.4 per 100,000, with pulmonary tuberculosis accounting for 3.8 per 100,000. The deaths from all forms of tuberculosis amounted to less than a third of the deaths from traffic accidents. There are now 10.15 hospital beds available per 1,000 population, and there is one practicing physician for every 864 of the total population.

Complications of Blood Transfusion.—At the Slagelse general hospital Dr. S. A. V. Jörgensen (*Ugeskrift for læger*, Jan. 22, 1959) investigated the frequency with which transfusion from a blood bank is followed by nonhemolytic reactions as tested by measurements of the temperature of the recipients before and after this operation. During the three-year period 1954-1957, 2,173 of the 4,223 transfusions were controlled by such measurements immediately before and half-hourly for three hours after a transfusion. The reaction was uncomplicated in 67.4%, febrile in 31.1%, and allergic (urticaria or angioneurotic edema) in 1.5%.

When the 233 febrile temperatures before transfusion were subtracted from the total of 677, there remained 444 (or 20.5%) which could be traced to the transfusion. Most of these could be dismissed as trivial, but 3 or 4% with a febrile reaction severe enough to call for preventive measures remained. No alteration in the incidence of reactions was observed after the introduction of infusion apparatus for use only once, but the author is exploring the effects of a routine addition of antihistamine to the blood immediately before a transfusion. Meanwhile the chief merit of the present study has been its demonstration of the great uncertainty over the underlying causes of the reactions to blood transfusion and how to prevent them.

FINLAND

Drug Addiction and Crime.—Westling and Riippa (*Ann. med. int. Fenniae* 47:205-222, 1958) investigated the criminal record of 169 drug addicts (107 men and 62 women) treated at some of the mental hospitals of Helsinki. Of these patients 75% of the men and 40% of the women had committed, at some time in their lives, at least one crime for which they had been sentenced. In a control group made up of men, the corresponding figure was 16.4%. Among persons who had become addicted before the war there was no primarily criminal patient, whereas among those who had become addicted after the war the percentage who were primarily criminals was 42% for men and 15% for women. Both of these groups contained a large number of persons who had committed crimes after having taken to drugs. For the postwar male group the figure was 78%. The crimes that increased after addiction were primarily theft, fraud, smuggling, and forgery. On the other hand, the number of violent acts remained practically unchanged. The number of these persons who had committed acts of violence must, however, be considered exceedingly high (about 20% of the men). About 60% of primarily noncriminal addicts committed some crime in the course of the eight years after addiction. Among physicians who had become addicts the percentage committing crimes was far below the average. Primary as well as secondary criminality attained the higher figures, the younger the persons were when they became addicted to drugs. The more accidental the reason for addiction, i. e., the more powerfully it had been motivated by a desire for euphoria, the more accentuated was the criminality.

Reserpine and Vascular Changes Caused by Smoking.—Experiments with 18 healthy subjects confirmed that smoking one cigarette increased the heart rate and the systolic blood pressure and decreased the cutaneous temperature of the foot. Iisalo and Kärki (*Ann. med. exper. et biol. Fenniae* 36:343-349, 1958) gave these subjects 1.0 to 1.5 mg. of reserpine a day for three or four days and observed that smoking increased the heart rate and lowered the cutaneous temperature significantly less under reserpine treatment than in the control experiments without reserpine.

Methanol Poisoning.—A. R. Alha and co-workers (*Ann. med. exper. et biol. Fenniae*, 36:444-455, 1958) attempted to ascertain whether in forensic practice it would be possible to use the determination of formic acid in brain, kidney, liver, and blood as a criterion of methanol poisoning, if no urine was available. In the estimation of formic acid, distillation in steam was used for the isolation and the oxidative reaction with mercuric chloride for the determination, the yield of mercurous chloride being measured gravimetrically. The yield was found to be 70 to 90% in the urine, brain, and kidneys. By contrast, the liver and, in particular, the blood gave smaller yields. In addition, "normal" formic acid concentrations were found to be 5 mg. or less per 100 Gm. In 10 fatal cases of methanol poisoning the formic acid concentration in the organs examined was markedly higher than "normal." In all cases methanol was qualitatively demonstrated in a steam distillate of mixed viscera. This investigation showed that for the detection of acute methanol poisoning it was often sufficient in forensic medicine, when methanol had been qualitatively detected in the body, to prove that the concentration of formic acid was increased in the urine or, if urine was not available, in the viscera, preferably the brain or kidneys.

Smoking, Serum Cholesterol, Blood Pressure, and Obesity.—Keys and Brozek, with the collaboration of Finnish workers (*Lancet* 1:492, 1959), examined the effect of cigarette smoking on serum cholesterol levels, blood pressure, and obesity in 360 male smokers and 165 male nonsmokers in Helsinki and the rural districts of west and east Finland. They reported that in all regions and in all age groups, except in those aged 50 to 59 in west Finland, smokers had a higher average serum cholesterol level than nonsmokers. Among smokers those who smoked most tended to have the highest serum cholesterol level. At all ages and in all regions in Finland smokers tended to have slightly lower blood pressures than nonsmokers, although the difference between them was small. In both rural areas the smokers tended to be slightly thinner than the nonsmokers, although in Helsinki there was no clear relation between smoking and obesity. The authors pointed out that their data did not explain the origin of the differences in serum cholesterol levels, blood pressure, and body fat. They could not, therefore, conclude that habitual cigarette smoking caused the serum cholesterol level to rise, the blood pressure to fall, or the body to lose fat. Brozek and Keys in another study found that men who stopped smoking tended to become fatter, an observation in keeping with the general view that smoking curbs the appetite.

NETHERLANDS

Diabetic Survey.—J. D. Mulder and E. van de Weg (*Huisarts en Wetenschap*, p. 66, December, 1958) made a survey for undetected diabetes in three districts with a total population of about 31,700. The preliminary screening was made with Clinistix and, if glycosuria was suspected, a glucose tolerance test was made. In one district (about 10,000 people) 0.41% were found to have undetected diabetes. In the second district (about 14,000 people) the percentage was 0.22, and in the third (7,700) it was 0.19. The wide variation of the percentages obtained in these three districts might be due partly to analytical errors made in districts 2 and 3. On the whole, however, these figures are much smaller than those reported in other countries. Of the 88 patients whose diabetes was thus detected, 3 were between the age of 20 and 40; 32 were between 40 and 60; and 53 were over 60. In most the diabetes was mild but in 31 the fasting blood sugar level appeared to be more than 300 mg. per 100 ml.

The Reliability of the Differential Leukocyte Count.—C. L. Rümke and C. van Eeden (*Nederl. tijdschr. geneesk. 102:2505, 1958*) discussed the reliability of the differential leukocyte count. They first considered whether the smears were correctly made. The variability can be calculated statistically. When, for example, the blood contains 4% band-form neutrophils, the percentage found by counting 200 cells will vary in 95% of cases between 1 and 8%. In the remaining 5% a much larger deviation may be encountered. This variation will depend on the percentage present in the blood of the type of cells counted and on the total number of cells counted. By counting 200 cells of blood which contains 50% lymphocytes, the variability will be in 95% of cases between 39 and 61%. By counting 1,000 cells, this variation will be 46 to 54%. Mostly, however, the physician will be interested in the opposite: what is the reliability of the figures obtained? It is impossible to give exact figures, but it is possible to find 95% confidence limits. When 200 cells are counted and none of one type of cell is found, this means that up to 4% of that type of cell may be present. When 5% are found this means that from 1 to 12% may be present. For 10%, these figures are 4 and 18; for 25%, 16 and 35; and for 50%, 39 and 61.

Hemolytic Streptococci in Children.—H. C. Zanen and S. Wagenaar (*Nederl. tijdschr. geneesk.* 102:1198, 1958) investigated the prevalence of group A hemolytic streptococci in healthy inmates of a children's home. The children, ranging from 2 to 7 years, were examined fortnightly over a period of two years. On the average 50% of the tests were positive. In the summer only a few children (about 2%) appeared to be infected. In the winter at times up to 100% of the tests were positive. In the two-year period there were seven epidemics, all of which were caused by different strains. On the average, 10% of the new infections were attended with illness. Each child had about three subclinical infections with a new type of the group A hemolytic streptococcus annually. In only two instances was a new infection observed with the same strain within four months. On the average each child had suffered every three or four years from a streptococcic illness.

Type 14 caused all of the 3 cases of scarlet fever and 7 of 13 other streptococcic illnesses observed in these children. This type was found in 40% of the 510 patients with scarlet fever who were treated in Amsterdam during the same period. This suggests an increased pathogenicity for this strain at the time of this investigation. In two children illness was caused by type 28; in two by type 12; in one by type 4/26; and in one by type 1. In view of the repeated occurrence of group A hemolytic streptococci in children, a positive culture is not believed to be of much clinical significance. The use of penicillin against streptococci should be limited to severe clinical infections and to the prevention of recurrent rheumatic fever. No purpose is served by keeping healthy carriers home from school.

A New Periodical.—In November, 1958, a new periodical, *Spreekuur thuis* (The Doctor at Home), made its appearance. It is issued by the Netherlands Medical Association to give the lay population information about health and medical science. The editor called attention to the increasing desire of the people to be fully informed about such problems. In view of the importance of good and reliable information, the association thought it wise to issue a magazine to which many specialists would contribute.

SWEDEN

Armchair Treatment for Cardiac Infarction.—Sture Helander (*Acta med. scandinav.* 162:351-359, 1958) reported on one series of 112 patients treated in an armchair and given anticoagulants and another series of 100 patients treated in an armchair without anticoagulants. In the first group the mortality was 10%, compared with 15% in the second group. A third series of 80 patients was treated with rest and anticoagulants, with the resulting mortality of 26%. The aim of the armchair treatment was not to increase the effort of the patients, but, on the contrary, to ease the burden of the heart muscle. The distribution of cases of cardiac infarction with regard to their severity was reasonably comparable in all three groups, with a somewhat lower percentage of severe cardiac infarction in the armchair group receiving anticoagulants. Most of those who died showed ominous prognostic signs such as arrhythmia or heart block. About half of the patients had had one previous attack of cardiac infarction as shown at autopsy. Of the 25 patients who were treated in an armchair and who died, 14 had had previous attacks. The frequency of embolic complications was negligible in all groups and was not thought to have had any effect on the issue. Armchair treatment seemed to constitute a good prophylactic measure against embolic complications and it seemed probable that it was sufficient to treat only the bad prognostic risks (those with arrhythmias, heart block, and cardiac failure) with anticoagulants.

Subarachnoid Hemorrhage.—Olle Höök (*Acta med. scandinav.* 162:475-492, 1958) reported a series of 152 patients who had subarachnoid hemorrhage and who were admitted within no more than one week after the hemorrhage. More than 90% were admitted in the first or second day of illness. The author suggested the classification of the patients in special risk groups, thereby greatly increasing the possibility of comparing material from different investigations. He also pointed out that patients with subarachnoid hemorrhage from different hospitals could not be considered congruent entities from the prognostic point of view even though, on the whole, they might be of the same degree of severity because such factors as age and treatment might vary according to the type of hospital. The mortality was highest on the first day, had decreased appreciably after the first two weeks, and was much lower after eight weeks. In from 10 to 15% of the patients the cerebral damage caused by the hemorrhage was of such magnitude that most were beyond help from any kind of therapy. The late prognosis was much better for the groups operated on than for those treated conservatively.

In the same issue Olle Höök reviewed a series of 138 patients with subarachnoid hemorrhage in which no aneurysm was revealed by angiography. Of these patients, 136 were followed for an average of 4.5 years. The average age at the time of admission to the hospital was 43 years and the sexes were evenly divided. The symptoms were usually relatively mild and 67% of the patients presented no focal neurological signs. The late prognosis with respect to recurrent fatal hemorrhage was favorable, with an incidence of 6%.

Causes of these hemorrhages were varied. With few exceptions, the investigations were complemented with vertebral angiography if the symptoms indicated that the basilar region was involved. In isolated cases arterial aneurysms may completely thrombose, making it impossible to trace them angiographically. In some patients a primary intracerebral hemorrhage appeared to have occurred with penetration of the hemorrhage into the ventricular system and/or to the surface of the brain in the subarachnoid space. This accounted for only 7% of the present series, however. The possibility of spinal subarachnoid hemorrhage, which is often difficult to distinguish from intracranial bleeding, should be considered. If the pain is initially localized in the back and radiates to the arms or legs, there is a fair possibility of spinal hemorrhage. Spinal subarachnoid hemorrhages usually arise from vascular tumors and malformations but are occasionally associated with other types of tumor such as sarcoma, ependymona, and neurinoma.

In suspected vascular malformations in the cervical and upper thoracic spinal cord, vertebral angiography may give valuable information. Vertebral angiography is indicated in subarachnoid hemorrhage when bilateral carotid angiography fails to show any source of the bleeding (1) if there are any neurological symptoms from the vertebral-basilar region, (2) in young patients, and (3) in recurrent hemorrhages. In this series 10 of the patients died. Autopsy, performed on five of these, revealed arterial aneurysms in two. One of these aneurysms was situated on the basilar artery and had not previously been visualized in the angiogram.

Spondylolisthesis.—The relationship between the lesions and the symptoms in spondylolisthesis was studied by Gösta Kollberg (*Nord. med.* 60:1778-1780 [Dec. 11] 1958) who stated that disk degeneration, rupture of a disk, and narrowing of the intervertebral foramina have one factor in common which could produce an increase in the symptoms, namely, abnormal mobility (instability) between the vertebrae. In a series of patients with spondylolisthesis of L_5 and S_1, the instability of L_5 and S_1 did not markedly influence the degree of severity of the subjective symptoms.

Burns.—Gunnar Birke and co-workers (*Nord. med.* 60:1824-1828 [Dec. 18] 1958) stated that an extensive burn could not be regarded as a lesion involving the skin only. It causes pathophysiological disorders in the whole body and is often accompanied by severe bacteriological complications. After an extensive burn large amounts of albumin are lost from the circulation, particularly in the early phase. There is also an abnormal distribution of albumin in the body, with accumulation of albumin especially in the subcutaneous tissue. In the first 24-hour period there is, in addition, hemoconcentration, increased destruction of blood cells, hyperkalemia, and acidosis. Later the hyperkalemia is often succeeded by hypokalemia. The sodium content of the blood varies from patient to patient, depending on the manner in which the fluid replacement is carried out. Urinary excretion of histamine, epinephrine, levarterenol, and corticosteroids is greatly increased at first and, excepting that of histamine which is normalized in 24 to 48 hours, it remains raised throughout the first week.

Cardiac catheterization was performed in a number of patients and in shock it provided valuable information to aid the differential diagnosis between hypovolemic shock and primary cardiac insufficiency. The tendency to pulmonary edema, which is present during the so-called absorption phase, does not seem to be associated with heart failure, but is probably a manifestation of capillary damage in the lungs, with a change in permeability on the basis of a direct burn or, possibly, caused by humoral factors or infection. Bacteriological studies have shown that in cases of infection in the skin lesions the first symptoms appear as a rule after the second day, and that staphylococci and gram-negative rods are the most important causative agents. Infections resistant to treatment and due to bacterial strains occurring in the hospital play a predominant role in these patients. In about 50% of those who die, infections, mainly in the form of bronchopneumonia and sepsis, are a contributory cause of death.

In the same issue these authors stated that during the acute phase in the course of extensive burns, intravenous replacement therapy is essential to prevent hypovolemic shock. Dextran is an excellent plasma expander, but in third degree burns involving more than 20% of the body surface whole blood should also be given and, if possible, albumin as well. Sodium bicarbonate and glucose should also be given at first. After 48 hours the sodium intake should be restricted and potassium given instead. Oxygen inhalations combined with careful checking of the ventilation is important in patients with pulmonary complications. Antihistamines should be given, but corticotropin is rarely indicated. Measures to prevent infection are important and should include isolation of the patient and treatment under aseptic conditions. When infection occurs, bacteriological examination with determination of antibiotic resistance should first be made. Antibiotics should be given in an adequate dose, preferably by the intravenous route. Excision and skin grafting of third degree burns should be performed as early as possible. The importance of centralization of the treatment of burns in a special center is stressed.

Sideropenia.—Ian Lundholm (*Nord. med.* 61:7-13 [Jan. 1] 1959) reported on a follow-up of 123 patients with hypochromic anemia of whom 117 were women. These patients were first seen in 1939. Two patients had developed cancer of the hypopharynx and one a sublingual cancer, which was cured. Of 80 who died one had cancer of the esophagus. The incidence of recurrence was high. Of the entire series 60 patients had a total of 142 relapses. The more severe ones were induced by acute causes, especially hemorrhage. Restoration to normochromia occurred only gradually with increasing age, probably indicating a slow building up of the depot iron. The irreversibility of the symptoms of sideropenia was higher in the patients who initially sought medical advice for their anemia only and in those who were traced secondarily through family members than in the rest who were incidentally discovered to have the disease. This was interpreted as evidence of a constitutional hereditary factor. A similar clinical course in three pairs of monozygous twins gave further support to the hypothesis advanced in 1939 that a dominant gene determines the tendency to inadequate absorption of iron, a tendency that is revealed in particular when large amounts of iron are lost by hemorrhage.

It was observed that 10.6% of all the patients and 26% of those with stationary achlorhydria had an acquired pernicious anemia. The incidence of this condition in the normal population is about 0.2%. Membranes in the hypopharynx were found in 20 patients. These were considered as especially disposed to cancer. The membranes were more resistant to iron therapy than were the other manifestations. Animal-protein deficiency was found in 38% of the patients at the initial examination but in only 10% of those followed up. Only a few showed a marginal intake of iron at the initial examination. Hereditary factors, marginal intake of iron in the food, and pathological bleeding have in adolescent girls been found likely to give rise to sideropenia, which will then recur with any slight extra demands on the iron depots.

Cholecystokinin in Cholecystography.—Tomenius and Backlund (*Nord. med.* 61:41-47 [Jan. 8] 1959) stated that preparations of cholecystokinin (CCK) corresponding to 0.04 mg. of substance per kilogram of body weight, a total of 3 mg. in adults, were injected intravenously in 650 patients in connection with cholecystography. Contraction of the contrast [illegible] and visualization of the bile duct was produced within 2 minutes, with a maximum after 15 to 20 minutes. In a series of 59 patients, the effect of the cholecystokinin test was compared with that of the egg-yolk meal, both tests being performed on these patients. The former test was found to be superior to the egg-yolk meal in that it saved time and was more reliable, particularly for visualizing the cystic duct and common bile duct. In 8 of the 59 patients the contrast medium-filled gallbladder did not respond to either stimulant. The CCK test was found to reduce the time necessary for cholecystographic analysis to one-fourth of that required by the egg-yolk meal. No severe side-effects were noticed. A further analysis of 612 patients who were examined later was made, and the phenomenon of good contrast medium filling without any visible stones combined with poor contraction of the gallbladder was also reported. A roentgenologic examination of the stomach can be made at the same time. Stones of the ductus choledochus were evacuated during cholangiography in one patient with CCK.

Ataraxics for Mental Patients.—In 1957 Bo Rydberg (*Nord. Med.* 61:93-95 [Jan. 15] 1959) started using ataraxics in treating 26 patients who were extremely dangerous to other persons in a maximum security pavilion. Such a pavilion requires special technical safety arrangements and a big nursing staff. Chlorpromazine, reserpine, perphenazine, and other drugs alone or in combination were used. After determining the maintenance dosage in each case, the patients were treated for 6 to 12 months. The results of this treatment were classified as not improved, distinctly improved, much improved, and greatly improved. Greatly improved meant that the patient could be kept in an ordinary mental hospital. Of these 26 patients 4 were in this category, 11 were much improved, 10 distinctly improved, and 1 not improved. One patient was actually transferred to an ordinary mental hospital and was working regularly when last observed. As a result of treatment the tension in the pavilion was greatly reduced. This was a relief to the staff and might even allow a reduction in their number.

Dystocia Eased by Vacuum Extractor.—O. G. A. Berggren (*Svenska läk.* 51:3715-3732, 1958) at the Linköping Obstetrical Clinic used a Malmström vacuum extractor as a substitute for forceps in difficult labor. Although the principle of the extractor had been known since the 18th century, it was only with the modification invented by Dr. Malmström in 1956 that any truly superior results were gained with it as compared with those when the forceps was used. Swedish experts believe that the use of the new instrument will reduce the number of cases of cerebral palsy. Two groups of women delivered with forceps and their children were studied and compared with a group of suction-delivered patients, a total of 150 deliveries. Not only was the new method more gentle on the child but also it speeded up labor and gave rise to far fewer serious perineal tears (26% perineotomies as against between 83 and 94% with forceps) or other complications.

As a rule the operation was over in a few minutes and the average postdelivery time was reduced to 8.7 days as compared with 12.7 days when a forceps was used. Vacuum extraction was suitable also as a substitute for certain types of cesarean section. An additional advantage is the possibility of reducing the delivery staff for, as opposed to the forceps method, the use of the Malmström instrument requires no anesthetization. The vacuum extractor on the contrary acts as a stimulus on the natural labor contractions. The synchronous application of the vacuum power and the voluntary labor movements of the mother make it possible to arrive at a process which more nearly approaches physiological delivery. This in turn, gives the child's head a chance to recover from the strain of passing through the birth canal. The Malmström instrument has all-metal suction cups. There are three sizes so as to permit reaching the head even when it is arrested in the upper sections of the pelvis. This is another clear advantage over forceps, which are difficult to apply in patients with a narrow pelvis.

Congenital Dislocation of the Hip.—Dr. S von Rosen of the Malmö General Hospital (*Nordisk Medicin*, Jan. 15, 1959) stated that since 1952 every baby has been tested shortly after birth by the Ortolani snap sign, a sensation evoked at the hip by a manipulative movement. By 1956 he was able to report on eight babies with 14 snapping hips. Roentgenograms showed upward displacement of the femur, indicative of dislocation, for which various forms of postural treatment were prescribed. In only two of these cases was it necessary to put the infant in a plaster cast for a brief period. In the other cases only ambulant treatment was required. In every case treatment was completed and the child could begin to walk when about a year old. Follow-up roentgenographic control showed normal or nearly normal development of the hips. Since 1956 six more cases have been discovered in this way and given appropriate treatment. As no other case of congenital dislocation of the hip has been discovered in Malmö during the period under review, it may be claimed that the above-mentioned procedure has proved effective in detecting this condition at birth. Improved x-ray technique with regard to both diagnosis and subsequent supervision has enabled von Rosen to shorten the fixation period.

Sympathectomy for Obliterative Arteritis.—Between 1930 and 1955 sympathectomy for obliterative arteritis was performed on 104 patients (88 men and 16 women) at the Serafimer Hospital in Stockholm. Dr. A. Kövamees (*Nordisk Medicin,* Jan. 22, 1959) made a follow-up study of these patients. Their average age at the time of operation was 53 years. The operation was undertaken to relieve intermittent claudication, pains and cramps at night, gangrene, or a sense of coldness in the limbs provoked by arteriosclerosis or diabetes. At first the operation was transabdominal but later on it was performed extraperitoneally. The operation was performed in two stages when it had to be bilateral. No deaths were attributable to the operation. Only four patients could not be traced. Of the rest 30 had died before the follow-up, which showed that for the most part even elderly patients had tolerated the operation well. Lasting improvement of claudication by itself or in combination with pain was most marked when it was associated with an efficient collateral circulation which should be a prerequisite for the operation in such patients.

Care of the Insane.—Reports of the proceedings of the Swedish Parliament give a good insight into what is happening in the country's state-owned mental hospitals. With more beds and a more rapid turnover of patients reflecting the success of modern methods of treatment, the number of admissions has risen from about 8,000 in 1950 to over 13,000 in 1957. There are now more acute cases and fewer chronic cases, with a steadily dwindling incidence during the last decades in the number of patients with schizophrenia and manic-depressive psychosis and a rise in the number of those with reactive psychosis, neurosis, psychopathy, alcoholic hallucinosis, and similar ailments. In the past many of those with acute conditions were not admitted to any mental hospital for such reasons as the deterrent effect of long waiting lists.

Willingness on the part of the patient to seek treatment in a mental hospital has increased. In 1940 barely 37% of the admissions were at the patient's request, whereas the corresponding figure for 1956 was 48%. Senile psychoses, so difficult to treat and so apt to be of long standing, continue to require from 20 to 25% of the mental hospital beds. Over 50% of them are still required for chronic conditions such as schizophrenia, but the outlook for them has improved, thanks to new methods of treatment sometimes helpful even in cases of long standing; but, although modern methods may have speeded up the turnover, the successes thus achieved have often been costly. The growing flood of acute cases now requires a complicated and costly set-up for both diagnosis and treatment, whether in the form of chemical laboratories or in the training of physicians in modern methods of psychological testing.

Functional Heart Diseases.—Since 1948 the Kristianstad Army Hospital has included a special department for dealing with functional heart diseases. Dr. G. Trönnberg (*Svenska Läkartidningen,* Feb. 6, 1959) reported a follow-up study of 164 young men who in earlier years had had a functional heart disease. These disturbances manifested themselves by dyspnea, palpitation, a precordial stabbing pain on exertion or even at rest, lassitude, or anxiety. Among the 145 who answered the questionnaire sent them were 41 who came to the hospital for reexamination. This showed that 16 had become subjectively free of symptoms. The objective picture was practically unchanged, although on the whole there had been some reduction of the blood pressure. The family histories indicated heredity as a potent influence in the genesis of the cardiac symptoms. Trönnberg urged his colleagues not to spoil such patients by prescribing tonics and the like.

Tularemia.—Between 1931 and 1956 tularemia was reported in 814 human patients. Of these 85% came from one county where the disease is evidently endemic. The remaining 15% were from all over the country, but several of them came from an area adjoining the county in question. Here about 11% of the population showed a positive reaction to specific intracutaneous tests, so it is likely that in such an endemic area the disease occurs in an asymptomatic form. During 1952 and 1953 a lookout for this disease was kept at the bacteriological department of the General Hospital in Malmö by submitting serums received for the Widal test to routine examinations for tularemia agglutinins. They were never found, but in the summer of 1958 six patients (all women) with tularemia were admitted to this hospital. Dr. S. E. Björkman and coworkers (*Svenska Lakärtidningen,* Jan. 30, 1959) stated that suspicion of tularemia was raised by the combination of recurrent attacks of fever, pain in the muscles, and a universal erythema. The diagnosis was confirmed by a high agglutination titer. Four of the six patients presented a general rash or scattered hemorrhagic patches. In some the location of the rash suggested that stinging insects may have conveyed the infection from some animal host.

UNITED KINGDOM

Abortion on Television.—The subject of abortion was discussed on the British Broadcasting Corporation's television station by a psychiatrist, a gynecologist, and a forensic pathologist, all of whom were anonymous. Two girls, with their backs to the screen, opened the program with accounts of operations they had undergone at the hands of illegal abortionists. These operations were illustrated with anatomic diagrams and a close-up of a 3-month-old human fetus, which was shown to stress the point that at this period a miniature human being with a right to live is in existence. The pathologist presented the law on abortion. He told viewers that even when performed legally, with genuine medical indications, abortion could be dangerous and result in lifelong disability. The high incidence of criminal abortion in Britain (between 5,000 and 6,000 reported annually) and the septic conditions under which most abortions are performed were pointed out. The view was put forward that there was some benefit in legalizing abortion after rape, incest, rubella in early pregnancy, and in cases where the mother threatens suicide. The psychiatrist, however, disagreed with the last mentioned. This was an honest attempt on the part of the BBC to expose abortion as a major social evil. The program was mildly criticized by the *British Medical Journal*, which considered that the introduction was overdramatized and that a description of the complications of abortion and rubella in early pregnancy might alarm some of the viewers personally confronted with these problems, but the journal's comments were on the whole favorable.

Epstein's Brain.—Sir Jacob Epstein, the famous sculptor, made a bronze bust of Sir Russell Brain, former president of the Royal College of Physicians. The bust, presented by fellows of the college, was unveiled in the library after a dinner attended by Epstein, Brain, and the fellows. In a humorous speech Brain said "I am the speaking likeness of a bust by Epstein."

Forgotten Swab in the Abdomen.—In June, 1958, a woman was awarded $7,850 damages against a surgeon and a hospital authority for leaving a swab behind after an abdominal operation. The operation, which was an emergency procedure for repair of a ruptured uterus, was attended by excessive bleeding for which a large number of packs and swabs were used. It was estimated that 3.0 to 3.5 liters of blood were removed from the abdominal cavity. One of the swabs was inadvertently left in the abdomen. At a subsequent operation for intestinal obstruction the retained swab was found to be the cause. The judge held that the surgeon was negligent in not counting the swabs correctly and in leaving one in the patient's abdominal cavity. The case was taken to the court of appeal, where the judgment against the surgeon was reversed. He was exonerated from negligence and was in fact praised for saving the patient's life. It was held that without his speedy intervention the patient would have died from hemorrhage and that at the time the patient's condition was such that an exploration of the abdomen to look for swabs might have been fatal. The court, however, dismissed the appeal of the hospital authority, although it reduced the damages from $7,850 to $2,100. It held that there had been negligence in failing to count the swabs correctly and that the hospital was ultimately responsible for this. Operating room routine, it was argued, was designed to deal as efficiently with emergency operations as with planned operations.

Treatment of Cancer by Irradiation and Infusion of Stored Marrow.—The inevitable result of high-dosage irradiation for the treatment of cancer is bone marrow damage. This, and the unpleasant constitutional effects on the patient, has prevented the full use of radiation therapy in the treatment of metastatic tumors. Newton and co-workers described the use of stored autogenous bone marrow to combat the hematopoietic damage caused by irradiation in cancer patients (*Brit. M. J.* 1:531, 1959). The entire thorax of two selected patients with multiple pulmonary metastases was treated by means of the 2 Mv. Van de Graaff generator, delivering a dose of 3,000 r in two weeks. Two days before, during, and after irradiation the patients were given 20 mg. of prednisone and 100 mg. of vitamin K daily and 4 mg. of perphenazine three times a day. Before irradiation, with the patient under local anesthesia, bone marrow was aspirated from both iliac crests and the sternum and stored aseptically after dilution at −79 C. The volume of marrow obtained was 30 to 60 ml., containing 0.5 to 1.5 by 10^9 red blood cells. At the completion of the course of irradiation the bone marrow was thawed and injected intravenously. Within two to four weeks there was evidence of marrow regeneration in both patients. They tolerated the radiation well and experienced no immediate untoward side-effects directly attributable to it. The first patient had severe dyspnea and respiratory symptoms, but this was almost certainly due to the progress of the pulmonary metastases. The results showed that the entire thorax can be irradiated to 3,000 r in two weeks with no constitutional disturbance.

Immunization Against Helminthic Infection.—Although much experimental work has been published, the control of heminthic infection by vaccines has not hitherto been possible. A group of workers at the Glasgow Veterinary School has solved the problem of the helminthic infection of young cattle, called "husk," by administering a vaccine made from larvae attenuated by irradiation (*Proc. Roy. Soc. Med.* 51:743, 1958). The causative organism settles in the lung of calves, in which it causes high morbidity and mortality. Recovered cattle have a strong immunity to reinfection. The Glasgow workers found that some degree of immunity was afforded by intramuscular injections of whole worm vaccine, but that an oral vaccine of living but attenuated infective larvae was even more effective in preventing infection. The essential part of the technique is attenuation of the larvae by irradiation with roentgen rays before administration as a vaccine. The attenuated larvae migrate from the intestine to the lungs through the mesenteric lymph nodes, but here they die after provoking the necessary antigenic action. This technique has been explored with success in other helminthic infections of dogs and cattle, such as hookworm, cysticercosis, and nematodiasis.

Complications of Steroid Therapy.—Three cases of intestinal perforation after the administration of steroids to patients with rheumatoid arthritis were reported by Parker and Thomas (*Brit. M. J.* 1:540, 1959). One patient, who was treated with 30 mg. of prednisolone daily and then 150 mg. of cortisone daily, developed severe abdominal pain. Laparotomy revealed a recent 4-cm. perforation of the sigmoid colon. The perforation was repaired but the patient died from peritonitis. Another patient, under treatment with cortisone, died from the same condition after perforation of the cecum. The duodenum was perforated in the third patient, who was under treatment with cortisone. It was repaired but the patient died the following day. At autopsy the three patients were found to have widespread arteritis with fibrinoid necrosis. These patients had had no preexisting gastrointestinal disease. It was concluded that the intestinal perforation and arteritis were abnormal reactions to the cortisone.

Frozen Eye Bank.—Dr. B. Rycroft stated that eyes may soon be preserved almost indefinitely by deep-freeze storage. Corneal grafts have been thus preserved for many weeks, compared with one week's storage by older methods. The difficulty of corneal grafting at the moment is not only obtaining enough eyes but getting fresh material. Long-term preservation of eyes in an eye bank would help to solve this problem. Successful corneal grafting operations have risen from 10% 20 years ago to 60% today. In Britain the supply of grafting material has markedly increased since the passing of the Corneal Grafting Act of 1952, which awakened the public conscience to the needs of the blind. At the Corneo-Plastic Unit, East Grinstead, the number of eyes received now is six times what it was before the passing of the act. A mobile team is present at the unit ready to collect eyes from recently deceased persons. If deep-freeze storage proves successful, an eye bank could be built so that eyes for corneal grafting would always be available for the whole country. Rycroft said that the bequest of eyes after death is a direct contribution to the relief of blindness in this country. It is a gift of the highest order of humanity which anyone with normal eyes can easily make.

Fetal Tissue Bank.—Grafts of living cells exchanged between unrelated members of a species are destroyed after a short interval by an immune response of the host's lymphoreticular system—the so-called homograft reaction. Exceptions to this occur where the graft is "insulated," as in the cornea, or where the host's immune system is ineffective owing to immaturity, as in the fetus. Kay and Constandoulakis discussed the possibility of using fetal hematopoietic cells for transplantation after massive irradiation, either accidentally induced or from high-dosage radiotherapy (*Brit. M. J.* 1:575, 1959). The supply of human fetal tissue is severely limited, as during the first three months of pregnancy the fetus is small and seldom obtainable in a sterile and intact form. In the last three months, as the fetus is legally alive, the parents' consent must be obtained for disposal. Fetuses are also obtained as a result of terminations of pregnancy between 12 and 18 weeks. Twelve hours after delivery the cells of the fetus are no longer viable at room temperature, although if kept at 4 C cell death is appreciably delayed.

The authors organized a 24-hour service with the help of gynecologists in many London hospitals. The liver is the main source of fetal hematopoietic cells. No attempt was made to use spleen or bone marrow. The liver was dissected under sterile conditions and reduced to a cell suspension by pressing through a wire mesh, removing stroma, and breaking the tissue up into individual cells, which were cultured anaerobically and aerobically and stored at 4 C for 12 to 24 hours or at —79 C for longer periods. Short-term culture of a cell suspension can be made at this stage. Cells are preserved at —79 C for months or years. Using the technique of autoradiography the authors showed that desoxyribonucleic acid synthesis continues after freezing and thawing in 15% glycerol serum, but they did not know what proportion of stem cells survived. It costs less than $280 per year to store 5 liters of fetal tissue suspension, or about 3 by 10^{12} cells, by means of dry ice. Suspensions of these thawed cells can be given intravenously. By virtue of some extraordinary homing instinct these cells find their way to the appropriate site in the body, where they settle and multiply.

New Penicillin.—An important development in the antibiotic field was made by Batchelor and coworkers, of the microbiological unit of the Beecham Research Laboratories (*Nature* 183:257, 1959). They isolated from penicillin cultures 6-aminopenicillanic acid, from which a number of new penicillins may be obtained. It is hoped thus to produce penicillin O (allylmercapto-methyl penicillin) and cephalosporin N (α-amino-adipic penicillin), which do not cause reactions in penicillin-sensitive subjects. A new approach to the problem of penicillin resistance, particularly staphylococcic, is now a possibility. It is hoped that the new penicillin derivatives may prove active against such resistant organisms. Means may be found for increasing the activity of penicillin-type compounds against gram-negative bacteria. Some of the new penicillins are being tested against the organisms of whooping cough, scarlet fever, diphtheria, gas gangrene, tetanus, typhoid, meningitis, leprosy, and respiratory infections.

New Tranquilizer.—Stelazine (trifluoperazine hydrochloride), a fluorinated derivative of prochlorperazine, is a new tranquilizer. Macdonald and Watts used it to treat 50 patients with acute and chronic paranoid schizophrenia (*Brit. M. J.* 1:549, 1959). The dose given was 5 mg. daily for the first three days, thereafter increasing by 5 mg. daily at three-day intervals until side-effects were produced or until a satisfactory therapeutic result had been obtained. When symptoms had been controlled the dosage was reduced to a maintenance level on which the patients were free from side-effects and at which the therapeutic effect seemed maximal. The maximum dose was 45 mg. daily and the average maintenance dose was about 22.5 mg. daily. Trifluoperazine was given to 30 male chronic paranoid schizophrenics who had been hospitalized for at least two years, and to 20, admitted during the first attack of less than six months' duration, who had not had any previous treatment. The results were judged on the basis of the patients' capacity for adjustment to normal social surroundings. Of the 30 chronic cases 21 showed improvement ranging from suitable adjustment to life in the hospital community (12) to discharge from hospital to full employment (5). The results in the early cases were gratifying. Of the 20 acute cases 14 were able to return to full employment and 6 were well-adjusted socially within the hospital community. Trifluoperazine should prove a valuable addition to the drugs available for the treatment of schizophrenia.

Physiotherapy in Arthritis.—The value of physiotherapy in patients with arthritis was assessed by Hamilton and co-workers (*Brit. M. J.* 1:542, 1959). A trial was designed to study the effect of short-wave diathermy, infrared radiation, faradic stimulation, and paraffin wax baths on functional improvement in patients with rheumatoid arthritis or degenerative joint disease involving the hands or knees. These joints were chosen because they are the easiest in which to assess function accurately. Sixty-two patients were treated for a month with each form of therapy selected at random and the results compared with a period in which no physiotherapy was given. In addition, all patients were given analgesics and splinting as required, with active exercises after the treatment. Range of movement, power of extension of the joints, and the time taken to walk up and down standard stairs and over a measured distance were calculated for each patient before and after each treatment. No significant difference was found among any of the four treatments, nor was there evidence that any of the forms of physiotherapy gave significantly better results than no treatment, other than that with simple exercises, splinting, and analgesics. The authors concluded that the most useful physiotherapeutic measures for arthritics are those maintaining muscle power and joint movement by active exercise, good posture, and coordination of movement.

Fetal Blood Cells in Maternal Circulation.—It has recently been shown that the hemoglobin of adult red blood cells in a fixed smear can be eluted by an acid phosphate buffer, whereas the hemoglobin of fetal blood cells cannot. Using this test Zipursky and co-workers showed the presence of fetal blood cells in the blood of women just after delivery (*Lancet* 1:451, 1959). Smears of in vitro mixtures of fetal and adult blood were scanned for two minutes under the microscope. The number of fetal red blood cells counted varied from 2 in a dilution of 1:25,000 to 21 in a dilution of 1:1,000. When three adults were given 3.5 and 15 ml. of compatible placental blood intravenously, the fetal cells were demonstrated in the expected concentration in their blood. No fetal cells were found in male and nonpregnant female blood donors. The blood of 42 mothers, selected at random, and recently delivered, was examined on the second and sixth day post partum. In a two-minute scanning 1 to 16 fetal red blood cells were seen in 21% of the films. A count of 16 corresponds to 2 ml. of fetal blood in the maternal circulation. These observations suggest that the placental passage of fetal blood into the maternal circulation is common.

Atherosclerosis in Jamaicans.—Many workers have concluded that populations living on high-calorie high-fat diets have a higher mean serum cholesterol level and are more prone to develop ischemic heart disease than those living on simpler diets. Much of the evidence for this is circumstantial. Robertson recorded the incidence of atherosclerosis of the aorta at 500 autopsies in Jamaicans and has compared it with that in published series elsewhere in the world (*Lancet* 1:444, 1959). The population of the area studied was partly urban and partly rural, mostly Negro, with a few East Indian, Chinese, or Caucasian subjects. The predominantly Negro population in Jamaica was found to develop a degree of aortic atherosclerosis similar to that of a mixed population studied in New Orleans. The incidence of atherosclerosis runs parallel to that of ischemic heart disease in New Orleans, but not in Jamaica, where the incidence of myocardial infarction is much lower. Robertson therefore concluded that, since there is no constant relation between the incidence of atherosclerosis and that of coronary thrombosis, they are unlikely to have the same cause. He also stated that cerebral thrombosis, phlebothrombosis, and pulmonary embolism are comparatively uncommon in Jamaicans.

CORRESPONDENCE

CIRCULATING BLOOD VOLUME CHANGES

To the Editor:—It was distressing to read the article "Circulating Blood Volume Changes Incident to Major Orthopedic Surgery," by Powers and Hensley, in The Journal, Feb. 7, page 545. The major assumptions made in the article are that (1) any fluid administered into the vascular space remains there as is, in total; (2) iodinated albumin remains in the space to be measured, without leaving the circulation, for about 10 minutes; (3) no compensatory mechanisms are in progress during the surgical and anesthetic procedure, as well as during the mixing period; and (4) technically, a ±6% accuracy is obtainable in vivo.

None of these assumptions hold true when an intravascular volume is measured with plasma-bound elements. Phenomena of hemodilution and loss of fluid from the intravascular space are constantly in operation and are reflected in plasma volume changes. Whole blood and salt or glucose infusion have varying effects on the total volume (Thistlethwaite and others, *Surg. Gynec. & Obst.* 105:34-38 [July] 1957; Albert and others, *Anesth. & Analg.* 36:54-61 [Sept.-Oct.] 1957; Albert and others, United States Atomic Energy Commission Technical Information Service, no. AECU-3614 [March] 1957). Iodinated serum albumin leaves the intravascular space at a variable rate dependent on many factors (Gitlin, *Ann. New York Acad. Sc.* 70:122-136 [Aug. 30] 1957). Technically, to obtain a ±6% in vitro with iodinated albumin is very difficult due to the adherent properties of Risa to glassware (Reeve, *Ann. New York Acad. Sc.* 70:137-149 [Aug. 30] 1957).

The only correct method for measuring blood loss is measurement of total circulating red cell volume with red cells tagged with Cr^{51}. The technique is simple with no technical errors involved. Grave errors in judgment and measurement can be made by just measuring a total volume without estimating the cellular element, which is the only reliable method.

I do not contest the fact that considerable amounts of blood are lost during orthopedic surgery—far more than is estimated clinically; but I cannot agree with the method used and am sure that with proper measurements the facts and results would still be more striking. An additional measurement made 24 hours postoperatively would show the considerable blood loss that occurs from oozing.

S. N. Albert, M.D.
828 S. Wakefield St.
Arlington 4, Va.

To the Editor:—We believe that the validity of blood volume determinations with use of radioiodinated serum albumin is well established provided proper precautions are taken to reduce technical error. In fact, Hlad and Tanz (*J. Lab. & Clin. Med.* 52:289-298 [Aug.] 1958) reported a standard error of ±2% in vivo! That compensatory mechanisms are at work during anesthesia and operation is not questioned. Insofar as they do influence blood volume, it appears to be obvious that any blood volume determination, regardless of method, must reflect the changes they occur. Otherwise, the blood volume determinations would be without value.

The statement that the use of tagged cells is the only correct method, simple and without technical error, we believe, is open to debate. Adherence of chromium to glass has been reported (Small and Verloop, *J. Lab. & Clin. Med.* 47:255-260 [Feb.] 1956). Irregular mixing of radiochromate-labeled erythrocytes in the spleen has also been reported (Kraintz and others, abstracted, *Fed. Proc.* 17:89 [March] 1958). Pooling of erythrocytes probably occurs during operation. All of these factors can influence the accuracy of the method.

William F. Powers, M.D.
3244 E. Douglas
Wichita 8, Kan.

FALL-OUT AND LEUKEMIA

To the Editor:—In the United Kingdom foreign letter in The Journal, March 14, page 1234, is a note on fall-out and leukemia. The statement is made that I^{131} has never been linked with leukemia. The *New England Journal of Medicine* (260:76-77 [Jan. 8] 1959) contains an account of the sixth reported case of leukemia after use of I^{131} for hyperthyroidism. One of the six reports was in The Journal (165:1558-1559 [Nov. 23] 1957).

Herbert I. Harris, M.D.
20 Lowell St.
Cambridge, Mass.

FALSE-POSITIVE REACTION FOR ACETONURIA

To the Editor:—While testing, with phenolsulfonphthalein (PSP), the renal function of a patient with well-regulated diabetes mellitus, a strongly positive reaction for acetonuria was noted. This false-positive reaction was noted with the conventional test for acetone, using sodium nitroprusside, as well as with Acetest tablets (Ames Co.) and acetone test powder (Denco). These color reactions could be reproduced with PSP diluted with water and are undoubtedly due to the fact that all three tests for acetone take place at an alkaline pH. The color produced by PSP is not exactly identical with that produced by acetone but is sufficiently similar to provide a source of error. The false-positive test result for acetone can readily be distinguished from true acetonuria by the failure of PSP to evaporate on boiling. The color could also be distinguished by spectroscopy, but this method of examination is not generally available. A positive ferric chloride test result for diacetic acid is not given by PSP.

Hans W. Neuberg, M.D.
Berna J. Borneman, R.N.
620 W. 168th St.
New York 32.

MISCELLANY

PHYSICIAN WHO SERVED ON THE U. S. SUPREME COURT

James A. Tobey, Dr.P.H., LL.D.

Probably few physicians today are aware that their profession once contributed an eminent justice to the Supreme Court of the United States. He was Dr. Samuel Freeman Miller, a gentleman from Kentucky who was appointed to the Supreme Court in 1862 by President Lincoln. He served with distinction as an associate justice of this court for the next 28 years and on several occasions was considered for promotion to chief justice, although this honor went in 1864 to Salmon P. Chase, in 1874 to Morrison R. Waite, and in 1888 to Melville W. Fuller.

Dr. Miller was a lawyer as well as a physician, but until he studied medicine, and later law, he had had no formal education whatever. When he sat on the bench, however, he was regarded as an able and forceful exponent of the law, if not a scholarly one.

Born at Richmond, in the blue grass region of Kentucky, in 1816, Dr. Miller was only 20 years old when he entered the medical department of Transylvania University at Lexington. There he attended lectures for one year, leaving to teach school for a few months and returning to the medical department late in 1837 for less than six months, at which time he passed the necessary examinations and was awarded the degree of doctor of medicine early in 1838. With this sketchy foundation in medicine, in contrast to the eight or more years of college, medical school, internship, and residency required of modern American physicians, Dr. Miller set up in general practice in the mountain community of Barbourville, Ky.

Here he practiced medicine for the next 12 years, bleeding and purging his patients in accordance with the ideas of the times. He also became interested in a debating society, participated in politics as an antislavery Whig, and was appointed a local justice of the peace. These activities stimulated an interest in law. In those days the budding attorney, like many an aspiring medical student, usually served an apprenticeship with an older, established practitioner; but some, like Lincoln himself, merely read profusely in the commentaries of Blackstone, Story, and Kent and other available legal texts. Miller read so well that he was admitted to the bar in 1847.

Three years later he moved to Keokuk, Iowa, where he engaged in the practice of law. He also participated heartily in the activities of the newly formed Republican party. He was an ardent supporter of Abraham Lincoln, who in 1862 nominated Miller to the Supreme Court, an appointment which received the unanimous approval of the Senate. When Miller took his seat the Chief Justice was Roger B. Taney of Maryland, who had been appointed to this office in 1836 by President Jackson after the death of the great John Marshall, who had served for 34 years. Taney, incidentally, was a Roman Catholic, one of the first of his faith to hold this high office in the Republic.

During his nearly three decades on the bench of the Supreme Court, Mr. Justice Miller participated in some 5,000 cases and delivered the opinions for the court in 600 of them. One of these opinions, handed down in 1873 in the Slaughter House Cases (*16 Wall 36*), has a certain medical significance, since it held that an action by the state of Louisiana in granting a monopoly for the slaughtering of animals was a valid exercise of police power in the interests of the public health and not in contravention of the rights granted by the federal constitution.

Mr. Justice Miller, M.D., has been described as a tall, massive man, inclined to be domineering. Although self-educated, he was extremely well versed in the law. He died in 1890 at the age of 74. Although by no means the only physician who ever studied law and made a career of it, he was the only physician to sit on the Supreme Court of the United States, which in the course of 170 years has had 94 justices.

MEDICAL FILM REVIEWS

Portal Decompression: 16 mm., color, sound, showing time 29 minutes. Prepared by Charles G. Child, M.D., Boston. Produced in 1958 by Sturgis Grant Productions, New York, for and procurable on loan from E.R. Squibb and Sons, 745 Fifth Ave., New York 22.

This film is divided into two sections. In the first part animated diagrams depict the anatomy and physiology of the hepatic circulation and explain the etiological factors responsible for portal hypertension in terms of the clinical picture presented. In the second, a patient is introduced for whom portal decompression is indicated, and the surgical procedure for an end-to-side portacaval shunt is shown. The film demonstrates the value of audiovisual educational technique when proper coordination exists between the surgical team, the illustrator, and the photographic crew. The subject is presented in a style which is interesting and easy to understand. At all times the viewer knows what is being discussed or what is being done. An end-to-side portacaval shunt is demonstrated in a rather muscular and obese patient. This is a difficult photographic exposure to obtain; however, the anastomosis can be seen clearly. The emphasis placed on the importance of dilated lymph vessels, which may be injured during the course of dissection and thereby add to the morbidity or mortality, is particularly commendable. The author is also to be commended for the use of the term "esophagogastric varicosities" rather than merely esophageal varices. This film can be recommended to surgeons, medical students, and nurses.

Intracellular Recording in the Mammalian Heart: 16 mm., color, sound, showing time 21 minutes. Prepared by Theodore C. West, Ph.D., University of Washington. Produced in 1958 under a grant from the National Heart Institute, National Institutes of Health. Procurable on rental ($3.75) or purchase ($140.00) from The Film Center, University of Washington, Seattle 5.

This film presents a concise demonstration of the recording of membrane potentials of the various cardiac cells, in both the isolated atrium of the rabbit's heart and the dog's heart in situ. It acquaints the viewer briefly with the method of recording the potentials of individual cells with the floating glass electrode. The sequence showing depolarization and repolarization of cells in the sinoauricular node, in the atrium, and in the ventricle and the relation of the muscle to contraction are very well demonstrated. Changes induced by drugs (epinephrine and quinidine) and by variation of blood temperature are also shown. The photography and narration are excellent. The film has great teaching value, and it should be most welcome to all students of cardiac physiology and pharmacology.

Dynamics of Phagocytosis: The Interaction Between Group A Streptococci and Human Neutrophils in Vitro: 16 mm., black and white, sound, showing time 37 minutes. Prepared in 1958 by Armine T. Wilson, M.D., Wilmington, Del. Procurable on loan from Pfizer Laboratories, 630 Flushing Ave., Brooklyn 6, N. Y.

This film shows dynamically the process of phagocytosis, including chemotaxis, contact, ingestion, egestion, and leukotoxicity; and it depicts the events that occur when living streptococci and leukocytes interact in vitro. The phenomena of hemolysis, chemotaxis, and virulence are elucidated in relation to phagocytosis. The behavior of leukocytes and monocytes is shown. These and other interesting manifestations in the natural history of phagocytes are clearly and instructively illustrated. The film is well done and can be recommended for showing to medical students, biology students, physicians, and all interested in problems of immunity and susceptibility to disease.

Thursday's Child: 16 mm., color, sound, showing time 23 minutes. Produced in 1958 by and procurable on loan from Children's Medical Center, 4900 S. Lewis, Tulsa, Okla.

This film presents the diverse medical therapy programs available in the Children's Medical Center, including psychiatric service; child guidance clinic; school for the mentally retarded; training program for physicians, psychologists, and other medical personnel; and a 62-bed children's hospital providing a full program of rehabilitation for all types of children's disabilities. With the aid of a narrator and background music the viewer "tours" the medical center. The film deals with the story of the center's daily activities in caring for numerous physically and mentally disabled children. While it does not attempt to portray or teach any specific medical techniques, it is nevertheless interesting and should be of considerable help in stimulating the interest of the public and the medical profession in such activities.

Varicose Veins: 16 mm., color, sound, showing time 7 minutes. Produced in 1958 by Churchill Wexler Film Productions for and procurable on loan or purchase from the American Heart Association, 267 W. 25th St., New York 1.

The conditions leading to the development of varicose veins and methods of prevention and treatment are discussed in this film. Animation is used to illustrate the function of the blood vessels and valves related to understanding the problems of varicose veins. The onset and effects of relaxation of the vessels eventuating in varicose veins are depicted, and the anatomy of the veins is shown. The film points up the preventive measures, as well as what can be done when the condition develops. It is scientifically accurate and is highly recommended for adult audiences and also for family-living classes in high school and college.

MEDICAL LITERATURE ABSTRACTS

INTERNAL MEDICINE

Duodenal Ulcer Amongst Africans in Nairobi. Ashfaq Alam Khan. East African M. J. 35:679-684 (Dec.) 1958 [Nairobi].

The series of 28 patients with duodenal ulcer presented were admitted to the King George VI Hospital in Nairobi, Kenya, from August, 1957, to May, 1958. There were 20 males and 8 females. The criteria for diagnosis were: (1) a characteristic history; (2) a history of hematemesis or melena; and (3) the roentgenologic demonstration of an ulcer crater. The last factor was an essential prerequisite for inclusion in this study. The annual report published by the Kenya Medical Department shows the number of cases of duodenal ulcer in a rising curve, with a steep rise in 1956; similarly the figures for the King George VI Hospital show an upward trend. No particular liability or proneness to develop duodenal ulcer was observed in any tribe, nor was any tribe immune from it. All but 3 of the patients were between 18 and 40 years of age. All social groups were represented, and educational standards had no bearing on the incidence.

A dietary regimen, continued for 4 weeks, produced freedom from pain in 21 of the patients. All 10 who were reexamined 6 months later showed a healed ulcer on roentgenologic examination. Two others experienced relapses and had to be readmitted. One required gastroenterostomy. Four showed no improvement and refused operation. The author feels that medical treatment is adequate for the type of duodenal ulcer found in Africans, since the ulcer is generally small. One should resist the temptation to operate and try to persevere with repeated courses of medical treatment.

When people from the reserves come into the cities and take to a new mode of life, they are subjected to all the stresses and strains of the modern world. This may give rise to all sorts of anxiety states. In Africa, just as in any other part of the world, there are certain individuals who are ulcer prone, or have a large number of acid secreting glands in the stomach. The African reacts to the stress and strain of the pace of modern life in the same fashion as any other individual, and so is equally liable to get any of the stress diseases, of which duodenal ulcer is one.

The Role of Thoracotomy in the Differential Diagnosis of Pleural Effusion. J. M. Schless, H. N. Harrison and J. A. Wier. Ann. Int. Med. 50:11-33 (Jan.) 1959 [Lancaster, Pa.].

In an attempt to establish better criteria for the differential diagnosis of pleural effusion, the authors report on 63 patients with pleural disease who underwent open thoracotomy at the Fitzsimons Army Hospital in Denver between 1953 and 1956. The pleural involvement in all these patients either was due to tuberculosis or at some point in the course of the disease was seriously considered to be tuberculous pleuritis, or this condition could not be clinically excluded. The final diagnosis in 38 of the 63 patients was tuberculosis, and the remaining 25 patients were given a final diagnosis of nontuberculous pleuritis. The indications for thoracotomy were primarily diagnostic in 17 patients; in 14 patients the indications were both diagnostic and therapeutic; and in the remaining 32 patients thoracotomy was primarily a therapeutic procedure. Of the 63 patients, decortication was performed on 57, and 6 underwent open pleural biopsy in the course of a full exploratory thoracotomy. Pulmonary tissue was obtained by biopsy from 30 of the 63 patients.

All patients with the final diagnosis of tuberculosis had positive results from tuberculin tests. All patients with negative results from tuberculin tests were in the group with a final diagnosis of nontuberculous pleuritis. It is felt that a negative tuberculin test, done with properly prepared solutions and repeated 6 to 8 weeks after the onset of the effusion, effectively excludes tuberculosis as the cause of a given pleural effusion. However, positive results from tuberculin tests prove nothing as far as establishment of a diagnosis of tuberculosis is concerned, other than the fact that tuberculosis must be considered a possibility. The pleural fluid did not show consistent physical, chemical, or morphologic differences that could be relied upon to differentiate tuberculous from nontuberculous effusions. Only 7 (21%) of the 38 patients with a final diagnosis of tuberculosis had positive bacteriological findings on the pleural fluid aspirate. The

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The place of publication of the periodicals appears in brackets preceding each abstract.

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incidence of positive sputum and/or gastric aspirates (in only 14 [40%] of the 38 patients) was too low to be of differential diagnostic value in the negative sense.

Morphologic pleural changes established the presumptive diagnosis in 32 of the 38 patients. In 3 additional patients the diagnosis was established by the morphology of lesions discovered in the lung at the time of thoracotomy. In these 3 patients the diagnosis would never have been established had not full open thoracotomy with careful palpation of the lung been done. Thus, morphologic changes in the pleura and/or the lung established the diagnosis in 35 of the 38 patients. Morphologic findings in tissue obtained at open thoracotomy were, therefore, at least 92% reliable in this series in differentiating tuberculous from nontuberculous pleural effusions. Morphologic findings were unaffected even by prolonged chemotherapy in practically all patients, but the chances of bacteriological confirmation proved to be inversely proportional to the duration of preoperative chemotherapy. The specific drug regimens used did not seem to be important.

Follow-up information of from 6 months to 3½ years after discharge was available in 45 patients (71%). None of the patients with tuberculosis had relapsed, and in none of the patients who were cleared as having nontuberculous pleuritis had any evidence of tuberculosis developed since time of discharge. There seems to be a strong indication for a controlled study utilizing exploratory thoracotomy in pleural effusions of dubious causation. Except for a short period of preoperative drug coverage in all patients, antituberculous chemotherapy should be withheld in all patients who do not show morphologic or bacteriological changes compatible with tuberculosis. A long-term follow-up study on such a series of patients would seem to be of great value.

Whipple's Disease: Report of Four Cases, Including Two in Brothers, with Observations on Pathologic Physiology, Diagnosis, and Treatment. J. B. Gross, E. E. Wollaeger, W. G. Sauer and others. Gastroenterology 36:65-93 (Jan.) 1959 [Baltimore].

The authors report on 2 brothers, aged 62 and 63 years, and on 2 additional men, aged 44 and 50 years, with intestinal lipodystrophy (Whipple's disease), in all of whom the clinical and pathological pictures were typical. The cases of the 2 brothers constitute the second recorded occurrence of intestinal lipodystrophy in siblings. Some of the relatives of the 2 brothers had mental illness and diabetes mellitus, and the parents of the 4th patient also had diabetes mellitus and a "nervous condition." These findings suggest that diabetes mellitus and mental disease may be unusually prevalent among the relatives of persons with intestinal lipodystrophy. The pathological and clinical features of the 4 patients and of those reported on by other workers convinced the authors that intestinal lipodystrophy should be suspected in middle-aged white men with a chronic, wasting, steatorrheal diarrhea associated with antecedent migratory polyarthralgia. [To date the disease appears to have affected the white race exclusively, almost always men, and usually those of middle age.] Many patients had chronic cough, hives, chills and fever, ill-defined abdominal distress, and marked loss of weight. The patients usually appeared weak and wasted. Hyperpigmentation and hypotension were found in most of them, and peripheral lymphadenopathy was a common observation. Many patients exhibited an abdominal mass. The characteristic hematological findings were hypochromic anemia, increased erythrocyte sedimentation rate, and absence of macrocytosis. The concentration of mucoprotein in the serum was characteristically increased. Roentgenographically there was usually a deficiency pattern of the small intestine, and occasionally roentgenograms of the joints and spinal column revealed changes suggestive of rheumatoid arthritis.

Microscopic examination of the peripheral lymph nodes frequently revealed the presence of noncaseating granulomas suggestive of sarcoidosis. These nests of macrophages take the periodic acid–Schiff stain. Although the microscopic picture is not by itself specific, when it occurs in a patient with the characteristic clinical picture of intestinal lipodystrophy, the combination should serve to make one suspect more strongly this disease. The absolute diagnosis of intestinal lipodystrophy is a pathological one, resting on histological demonstration of macrophagocytosis of the tunica propria of the small intestine and mesenteric lymph nodes, and lipogranulomatosis of the mesenteric nodes. In the differential diagnosis of intestinal lipodystrophy clinically, one must consider sprue, adrenal cortical hypofunction (Addison's disease), Hodgkin's disease or other lymphoma, sarcoidosis, intra-abdominal malignancy, tuberculosis, regional enteritis, and chronic ulcerative colitis, as well as external pancreatic insufficiency.

The phenomenon of delayed excretion of water with regular nocturnal diuresis was observed in all 3 of the 4 patients in whom this phenomenon was tested. One of these 3 patients had a normal rate of absorption of heavy water in the fasting state. The diarrhea associated with intestinal lipodystrophy may or may not be bloody, but steatorrhea and azotorrhea are usually present, and the fecal fat and nitrogen losses may be similar to those characteristic of severe nontropical sprue and external pancreatic insufficiency.

Steroid therapy with cortisone, corticotropin (ACTH), and prednisone (Meticorten) proved disappointing in the 4 patients. The reports by other workers suggest that such treatment has usually been variable in effect and mainly of symptomatic help. One of the 4 patients had an apparently spontaneous remission, which included complete disappearance of the marked steatorrhea and which lasted almost 4 years preceding death.

Steroid Therapy in Pulmonary Fibroses. A. G. W. Whitfield. Brit. J. Dis. Chest 53:28-40 (Jan.) 1959 [London].

Of 35 patients with nontuberculous pulmonary fibroses and infiltrations treated with corticoids at the Queen Elizabeth Hospital in Birmingham, England, 6 had pulmonary sarcoidosis, 9 had irradiation damage of the lungs, 4 had diffuse interstitial fibrosis of the lungs (Hamman-Rich syndrome), and 16 had pulmonary infiltration occurring in collagen diseases, such as systemic lupus erythematosus (12), scleroderma (3), and polyarteritis nodosa (1). The results obtained with steroid therapy in these patients and the published reports by other workers showed that patients with pulmonary sarcoidosis in its earlier stages responded well to this therapy; it should be employed in all patients with respiratory symptoms or with progressive or persistent lung lesions. Permanent maintenance therapy is necessary to avoid relapse. Patients with irradiation damage to the lungs in the stage of pneumonitis appeared to respond to steroid therapy, and treatment for 3 months is suggested for all such patients. Patients with long-standing fibrosis did not respond, and corticoids are not considered to have any prophylactic value. The patients with the Hamman-Rich syndrome, except for one, were therapeutic failures; but since no other treatment can be offered, steroids must always be given a trial. The pleural lesions of systemic lupus erythematosus responded dramatically to steroid therapy. The interstitial pneumonitis occurring in this disease showed a less satisfactory response, but both pulmonary and pleural lesions should always be treated with corticoids. Permanent maintenance therapy is required to avoid relapse. The pulmonary lesions of scleroderma are unlikely to be improved by steroid therapy. The author's patient with pulmonary lesions associated with polyarteritis nodosa did not respond to steroid therapy, but 3 patients reported on by other workers did, and this therapy should be employed in every patient with polyarteritis nodosa.

Pulmonary Aspergillosis with Cavitation: Iodide Therapy Associated with an Unusual Electrolyte Disturbance. J. P. Utz, J. L. German, D. B. Louria and others. New England J. Med. 260:264-268 (Feb. 5) 1959 [Boston].

The authors report on a 47-year-old man and on a 63-year-old woman with an infection due to Aspergillus niger, associated with marked cavitation and abscess formation in previously damaged lung tissue. Carcinoma of the lung in the man and repeated attacks of pneumonia in the woman were the underlying diseases which presumably provided the appropriate environment for the superimposed fungous infection. Both patients were treated with a saturated solution of potassium iodide. The man received 30 Gm. daily for 2½ weeks, and the woman was given 24 Gm. daily for 3½ weeks; in addition, surgical drainage of the cavity was carried out in the second patient. Clearing of Aspergillus organisms from the sputum and lung tissue or abscess drainage material resulted from the treatment. Potassium iodide therapy was associated with a disturbance of the mental condition, manifested by exaggerated demands and disorientation in the woman. Hypopotassemia, with elevation of serum carbon dioxide content, and hyponatremia developed in both patients. In the woman, this bizarre electrolyte disturbance was associated with weight gain and with persistent excretion of sodium in a hypertonic urine, and these features suggest that the disturbance was due to inappropriate secretion of antidiuretic hormone, although the level of the serum electrolytes improved significantly in both patients when iodide therapy was discontinued. The woman also had hypocalcemia and hypophosphatemia for which no explanation could be given.

Pellagra in Ireland. E. A. Martin. J. Irish M. A. 44:11-15 (Jan.) 1959 [Dublin].

Three patients with pellagra were admitted to a private psychiatric hospital in Dublin. The first patient was a 42-year-old woman who had classical pellagra, showing, in sequence, diarrhea, dermatitis, and severe mental and neurological disturbance with stomatitis. The cause was probably a deficient diet of psychogenic origin. Death appears to have been due to unrecognized recurrence. The second patient was a 63-year-old woman who had acute confusional psychosis due to dieting, vomiting, and possibly malabsorption after gastroenterostomy. The first acute disturbance followed an operation. There was no dermatitis or glossitis. Within 3 days after onset of intensive oral and intramuscular vitamin therapy, diarrhea and incontinence ceased. The patient's mental state began to improve, and she took an interest in her surroundings. Within one week all confusion had disappeared. Her general health improved, and she put on weight. Oral vitamin therapy was continued. The third patient, a 49-year-old man, presented, in sequence, mental symptoms, a rash, and diarrhea. No dietary or intestinal cause was found. Sulfaguanidine, isoniazid, and streptomycin probably precipitated an acute confusional psychosis.

Since the patients were not poor, it is suggested that pellagra might be commoner in Ireland than is generally supposed. All 3 patients had passed through general hospitals, their condition undiagnosed. This emphasizes that the widespread view that pellagra is seen only in mental hospitals is untrue. Pellagra may be expected to occur chiefly in the elderly person living alone, the destitute, the mentally ill, the eccentric, the alcoholic, and those with some chronic gastrointestinal disease. Pellagra is caused by a deficiency of nicotinic acid. Often there is associated deficiency of other factors of the vitamin B complex—riboflavin and pyridoxine. The richest sources of nicotinic acid are meats, liver, kidney, heart, and yeast. Whole-wheat bread and cereals are good sources, but white bread, fish, milk, eggs, fruit, and vegetables have a poor content. Pellagra may develop secondary to infection or operation which may increase the need for vitamins, loss of appetite, enforced or prescribed dieting, vomiting, malabsorption due to rapid intestinal transit or steatorrhea, and alteration in intestinal flora. The foods rich in nicotinic acid are usually excluded in peptic ulcer diets. There is evidence that alterations in intestinal flora may be of importance. Bacterial biosynthesis of nicotinic acid in the intestine may produce up to 80% of the body requirements of this substance. Succinylsulfathiazole by its sterilizing action inhibits this production. Broad-spectrum antibiotics might be expected to have an even more potent effect.

The Treatment of Moderate and Severe Pneumococcal Pneumonia with Oral Phenoxymethyl Penicillin. J. T. Reeves, J. Garfield, N. Polasky and M. Hamburger. A. M. A. Arch. Int. Med. **103**:184-188 (Feb.) 1959 [Chicago].

In this report on the oral administration of phenoxymethyl penicillin (penicillin V) in the treatment of patients with pneumococcic pneumonia at the Cincinnati General Hospital, the authors add their experience of 1956-1957 to that of 1955-1956. In general, the results obtained during the second year on 68 patients confirmed those of the first year. Whereas during the first year's investigation several dosage schedules were explored, all patients during 1956-1957 were given an oral dose of 250 mg. of phenoxymethyl penicillin on admission and every 6 hours thereafter for from 3 to 14 days. Fifty-nine patients (87% of the 68) responded within 24 hours to the oral administration of phenoxymethyl penicillin with marked clinical improvement and prompt lysis of fever. The average duration of fever was 1.8 days, and no patient remained febrile beyond the 4th day.

The oral administration of phenoxymethyl penicillin has been shown to be an effective form of therapy for moderate and severe forms of pneumococcic penumonia. Oral therapy avoids the pain of injection, the expense and effort of sterilizing needles and syringes, and the dangers of needle-borne serum hepatitis. Although phenoxymethyl penicillin is not recommended for patients critically ill or having the purulent complications of pneumonia, it may be used with safety and confidence in the great majority of patients with pneumococcic pneumonia. The optimum dosage has not been established. Although patients treated by the authors were given 250 mg. every 6 hours, equivalent to approximately 1,600,000 units, patients treated by others received the same dose at 12-hour intervals, with similar results. Because an occasional patient fails to absorb phenoxymethyl penicillin as well as most subjects, the larger dose may be a safer one.

A Review of Fifty-One Cases of Multiple Myeloma: Emphasis on Pneumonia and Other Infections as Complications. H. Glenchur, H. H. Zinneman and W. H. Hall. A. M. A. Arch. Int. Med. **103**:173-183 (Feb.) 1959 [Chicago].

The recent renewed interest in the general problem of resistance to infections led to the discovery that patients with multiple myeloma are likewise susceptible to recurrent bacterial infections, particularly pneumococcic pneumonia. The authors present their observations on 51 patients with multiple myeloma, who were treated between 1947 and 1957 at the Minneapolis Veterans Administration Hospital. The diagnosis was established in each patient either by biopsy of bone marrow or accessible tumor or by autopsy and serum protein electrophoresis. The 51 patients with multiple myeloma represented 0.05% of 101,956 admissions. Thirty-four of the patients complained of bone pain usually localized to the back. Bone tenderness, the commonest physical finding, was found in 39 patients, mostly over the areas of pathological fractures or myelomatous involvement. Seventeen patients were found to have hepatomegaly at some time during their course. Nine patients had palpable tumors of either the skull, clavicle, sternum, rib, jaw, or pubis. Paraplegia was present in 5 patients. Forty-two of the patients are dead, 8 are living, and 1 has been lost to follow-up.

The authors were impressed with the high incidence of pneumonia. Twenty-eight patients experienced one or more episodes of pneumonia, exclusive of terminal pneumonia, during the course of their disease. A total of 76 episodes of pneumonia was experienced by these patients, averaging 2.7 bouts per patient. Electrophoresis of the serum of the 28 patients with pneumonia revealed only 1 patient with a normal protein pattern. Terminal pneumonia occurred in 17 of the patients. This reflects the increased susceptibility of patients with multiple myeloma to infection, the debilitated state, and the inexorable course of the disease. Seven of the 51 patients experienced bacteremia (14%). This incidence appears higher than chance would permit, and shows that the inability to produce effective antibodies leads to serious infections other than pneumococcic respiratory infections. Bacteria isolated from the blood included the Staphylococcus and Proteus organisms, Escherichia coli, and Neisseria catarrhalis. Twenty-nine of the patients had infections other than pneumonia, predominantly of the urinary tract. Repeated bacterial infections, especially pneumococcic pneumonia, should be emphasized as an important and often early complication of multiple myeloma. Antibiotics are effective unless their use is delayed.

Idiopathic Pulmonary Haemosiderosis in Adults and Adolescents. D. H. A. Boyd. Brit. J. Dis. Chest 53:41-51 (Jan.) 1959 [London].

Three cases of idiopathic pulmonary hemosiderosis are reported. Two occurred in men, aged 37 and 33 years, and one in a 19-year-old woman. Twenty-nine cases of this condition in persons over 16 years of age were collected from the literature. The more common clinical features were dyspnea, hemoptysis, and anemia; pyrexia, headache, hepatosplenomegaly, abdominal pain, and clubbing of fingers were less common. Natural remissions were frequent and in the author's 2 male patients lasted as long as 18 years and 5 years. The typical roentgenographic abnormality of miliary mottling, usually in the midzone and the lower zone, was almost always present at some stage of the disease. An acute attack may occur without roentgen-ray changes. As the causation of idiopathic pulmonary hemosiderosis remains unknown, effective therapy is lacking. The prognosis is serious. One of the author's 3 patients died, and 19 of the 29 patients reported by others were dead at the time of writing. The most recent work on the pathogenesis of the disease suggests that the elastic fibers of the small blood vessels of the lung are weakened by an increase in acid mucopolysaccharide. An analogy with senile elastosis and arachnodactyly has been drawn by other workers.

Staphylococcal Pneumonia. W. T. Couter. Illinois M. J. 115:57-61 (Feb.) 1959 [Chicago].

Hospital-acquired staphylococcic pneumonia represents a grave danger to life. The so-called "tame" or "hospital" Staphylococcus organism which causes this disease is present in nose and throat cultures of otherwise healthy hospital personnel. Eighty to 95% of physicians, nurses, and attendants harbor staphylococci in the anterior nares, and 60 to 75% of these organisms have been resistant to many antibiotics. The staphylococci may live for months in blankets or mattresses; the air itself acts as a medium of transference, and shaking out the blankets may disseminate the micro-organisms. The existence of such a large reservoir of pathogenic staphylococci renders likely the possibility of staphylococcic parasitization of the hospitalized patient. The widespread use of antibiotics for prophylactic reasons has been held partially responsible for the growing incidence of hospital-acquired staphylococcic disease. A patient entering the hospital with an antibiotic-sensitive strain of staphylococci generally maintains that strain throughout his hospital stay. In contrast, patients receiving either penicillin or a tetracycline tend to become carriers of the staphylococci predominant in that hospital. It seems evident that hospitalized patients, particularly those who receive antibiotics or steroids, can hardly escape from hemolytic staphylococcic colonization.

Staphylococcic pneumonia is a necrotizing process which makes treatment during the first hours mandatory. Sputum and sensitivity studies should be started as soon as a clinical diagnosis of pneumonia have been made, and energetic treatment with antistaphylococcic drugs should be instituted until the diagnosis has been confirmed. As certain strains of staphylococci tend to be constant and predominant in any one hospital, the choice of antibiotics might be determined by data already collected on previous cases by the hospital laboratory. Vigorous treatment by a battery of such antibiotics, to which other staphylococcic cultures have been sensitive, will not endanger the patient if the diagnosis should not be confirmed; in fact, such therapy may save the patient's life.

The Work of Breathing in Patients with Mitral Stenosis. R. Garbagni. Minerva med. 49:4832-4838 (Dec. 22) 1958 (In Italian) [Turin, Italy].

Energy cost of breathing was studied in 10 persons, 7 of whom (aged between 16 and 48 years) had mitral stenosis, and 3 had normal respiratory and cardiovascular functions. Dyspnea on exercise was present in all the patients, and dyspnea at rest in 2. The patients were unable to exert any excessive physical effort. Six patients had sinus rhythm, and one had total arrhythmia attributed to atrial fibrillation. The patients were free from symptoms of widespread cardiac decompensation. Roentgenograms showed an increased shadow either of the whole heart or of the right heart. The patients took 2 or 3 tests of hyperventilation at the breathing frequency of 30 or 40 a minute.

The energy cost of hyperventilation in persons of the control group increased proportionally with higher ventilatory volumes; it deviated from proportionality and became erratic in patients with mitral disease. Among the patients the lowest observed value of the cost of breathing oxygen per liter per minute was 0.53 cc. in a patient with very constricted mitral stenosis, associated with considerable limitation of chest movements caused by kyphoscoliosis. (Energy cost was stated, not in calories or other customary energy units, but in cubic centimeters of oxygen [1000 cc. O_2=4.825 Cal.].) The highest observed value of the cost of breathing oxygen per liter per minute was 12 cc. in a patient with mitral stenosis accompanied by pulmonary arterial hypertension. Use of the spirometer showed normal ventilatory values in 2 patients and decreased values, ranging from 29 to 41% of the theoretical normal values, in the remaining patients.

Although the scatter of the points on a two-dimensional plane, plotting the values of the energy cost of breathing, was more dispersed for patients with mitral stenosis than for the control group, yet the area containing these scatter points, either of the patients or of the control group, occupied approximately the same position in the diagram. The only exception was the patient with pulmonary arterial hypertension, who exhibited high values of the energy cost of breathing. Similarly, no direct relationship between the increased work of breathing and the degree of severity of a possible cardiovascular disorder could be postulated.

SURGERY

Total Cervical-Spine Fusion for Neck Paralysis.

J. Perry and V. L. Nickel. J. Bone & Joint Surg. 41A:37-60 (Jan.) 1959 [Boston].

The authors report on 100 patients with severe paralysis of the cervical muscles with residual instability of the head, who were studied at the Rancho Los Amigos Poliomyelitis Respiratory Center in Downey, Calif.; their object was to formulate a systemic therapeutic plan for those who had regained considerable use of their extremities and now needed a stable head and neck for maximum activity. Close examination of these patients revealed that the muscles of the neck form 4 functional groups, namely, flexors and extensors acting on the head, which were designated "capital flexors" and "capital extensors," and flexors and extensors acting only on the cervical spine, with motion centered in the lower cervical spine, for which the terms "cervical flexors" and "cervical extensors" were coined. Paralysis of the muscles of the neck may prevent the patient's taking advantage of the function that is present in his extremities. Paralysis of the capital extensors may greatly embarrass or completely prevent swallowing and speech by allowing the head to fall into extreme flexion.

Twenty-two fusions of the cervical spine, 10 of which included the skull, were performed at the Rancho Los Amigos Hospital during the past 2½ years. Results showed that total cervical spine fusion is an effective way of replacing the stability essential for general activity, and this fusion must include the occiput if the capital extensors are weak. A halo fixed to the cranium with screws and fastened to an adjustable countertraction device, which has been fixed to the body cast, proved to be a successful means of stabilizing the head and neck for fusion in a predetermined position. With the use of mechanical respiratory aid, the presence of respiratory paralysis is no longer a deterrent to safe major reconstructive surgery.

A Resectable Form of Multiple Mesothelioma.

M. S. Harris, M. M. Hyman and D. B. Nevius. Dis. Chest. 35:127-133 (Feb.) 1959 [Chicago].

The authors report on 2 women, aged 43 and 37 years, and a 51-year-old man with multiple mesothelioma of the pleura, for which these patients were operated on. Their cases had certain gross and microscopic characteristics in common. At surgical intervention it was noted that, although the tumors over the parietal surface were quite hard and appeared to involve the underlying soft tissues, bone itself and deep structures were not invaded, and the tumors were movable. The diffusely spread masses could be stripped from the chest wall along with the pleura without resorting to rib resection. Although the frozen section made in the course of the surgical intervention was reported as adenocarcinoma, it was decided, in the case of the first woman, to rely on clinical judgment and to proceed with radical resection. This patient is living and well more than 5 years after the operation. In the case of the man, the frozen section was reported as "papillary adenocarcinoma of the pleura, possibly metastatic, possibly mesothelioma." Because of this report, the situation was deemed hopeless, and the chest was closed. The patient was reoperated on 6 months later, but complete removal of all visible tumor was no longer possible. The pathological diagnosis on the permanent paraffin sections was "mesothelioma of the pleura." The patient died 7 months later, with widespread involvement of the chest wall, mediastinum, and pericardium. In the case of the second woman, a radical pleuropneumonectomy was performed, although the frozen section was reported as adenocarcinoma. The patient is doing well 2 years after the surgical intervention.

The point is raised that the resemblance to adenocarcinoma in frozen sections might lead the surgeon to abandon the surgical intervention in the belief that a hopeless situation exists. It is suggested that the pattern of clinical course, chest roentgenogram findings, and gross findings at surgical intervention should raise the question of a resectable mesothelioma of the pleura, despite a contrary pathological report based on a frozen section. Later, close studies of permanent paraffin sections of the 3 cases in this series were interpreted as mesothelioma because of a differentiation not possible on the frozen-tissue study. These observations emphasize the unreliability of the frozen section in diagnosing mesothelioma of the pleura and the need of clinical awareness of its deceptive appearance both microscopically and grossly.

Lower Esophageal Rings: Report of 14 Cases. J. R. Spencer, R. W. Hammer and W. H. Wierman. Am. Surgeon 25:20-24 (Jan.) 1959 [Baltimore].

The authors direct attention to an abnormality of the distal part of the esophagus, which has been designated as "contractile ring of the lower esophagus" or as "Schatzki ring." They detected it in 14 patients studied in the x-ray department of the Presbyterian Hospital, Denver, in an 18-month period from March, 1956, to September, 1957. Data on these 14 patients are summarized. Only 4 presented the characteristic symptom of intermittent dysphagia; in each of these 4 patients the size of the ring was 13 mm. or less. In 7 patients an esophageal hiatus hernia was demonstrable roentgenologically in association with the ring. Failure to clearly demonstrate such a hernia in the remaining 7 patients does not, however, exclude its presence. Only 2 patients were under 50 years of age, and both of these were without dysphagia. Of the 4 patients with dysphagia, 3 were treated by esophageal dilatation or dietary instructions. The 4th patient was subjected to surgical exploration because of poor response to surgical measures.

The distal part of the esophagus was mobilized, there being no evidence of an esophageal hiatus hernia. Palpation of the esophagus revealed no abnormality except possibly some increased thickening of the wall at the level approximately 4 to 6 cm. above the diaphragm. The esophagus was opened longitudinally at this level. An exploring finger was then inserted into the esophageal lumen and was passed with ease distally into the stomach and proximally. The esophagus was closed in 2 layers without a definitive surgical procedure being performed. The dysphagia disappeared after this exploratory procedure. It is probable that myotomy was performed inadvertently.

The anatomic substrate of the roentgenographic entity of "contractile ring of the lower esophagus" has not been clearly demonstrated, but limited observations suggest either an overactivity or hypertrophy of the inferior esophageal sphincter. The anatomic findings in the few surgically treated patients were conflicting. Only the smaller rings (13 mm. or less in diameter) cause dysphagia; the larger rings are asymptomatic. Conservative treatment provides symptomatic relief in most patients.

Virilizing Tumor of the Adrenal Gland with Pigmentation and Arterial Hypertension Successfully Treated by Surgical Exeresis. P. Mozziconacci, C. Dubost, J. L'Hirondel and others. Semaine hôp. Paris 34:3173-3179 (Dec. 24) 1958 (In French) [Paris].

The authors report on a girl, 2 years of age, with a precocious puberty syndrome. The case was unusual in that manifestations were very early, and there was abnormal pigmentation and arterial hypertension, which intervention caused to disappear. Body hair was heavy and black; external genital organs were quite developed; acne was present on face and back; there was considerable muscular force; the voice was deep and harsh; and bone development was equal to that of a child of 6 years. Androgenic hyperactivity originated in the adrenal gland. Absence of response to corticotropin (ACTH) permitted determining that hyperplasia was not present, and, therefore, a tumor was sought. Much elimination of fraction B of the 17-ketosteroids confirmed the impression. Roentgenologic examination showed a tumor, the size of a grapefruit, which lowered the right kidney. It was removed and found to be a corticoadrenal adenoma. After the operation precautions were taken to avoid a sudden drop in the patient's arterial pressure. Adrenal insufficiency was supplemented with hydrocortisone, cortisone, and desoxycorticosterone. The left adrenal gland was reactivated with ACTH. Fifteen months after intervention the clinical transformation was complete. The child's hair became blond, the skin became fine, and the height and weight increased in normal proportion for age.

The authors suggest that the problem of distinguishing a tumor from hyperplasia of the adrenal gland is partly settled by the criterion of time of appearance of clinical signs. In virilizing tumor, signs are present very early, in this case at birth. In hyperplasia, clinical signs do not appear for several months and frequently not for several years. Absence of response to ACTH and much urinary elimination of dehydroepiandrosterone confirmed the probability of tumor in this case. Hyperpigmentation is generally attributed to excess functioning of the hypophysis, which is no longer checked by cortical secretion. Hypertension in the presence of adrenal gland tumor in a child may be the result of an endocrine mechanism.

Crohn's Disease. A. V. Pollock. Brit. J. Surg. 46:193-206 (Nov.) 1958 [Bristol, England].

In the present study, a group of 34 patients, first reported in 1950, has been reexamined, and the series extended by the addition of all patients with regional ileitis (Crohn's disease) admitted to the Leeds General Infirmary from 1950 to 1956. In all, the cases of 108 patients (48 male and 60 female), ranging in age from 4 to 69 years at time of operation, were reviewed. The author prefers the term "Crohn's disease" because he feels that even the least specific of the noneponymous names is too restrictive to describe a disease which sometimes shows itself in a diffuse and not a regional inflammation. He excluded from this series all patients with lesions not conforming to a provisional definition of Crohn's disease as "a chronic inflammatory disease of the gastrointestinal tract of unknown etiology, usually manifesting itself in the form of localized thickening of the intestinal wall, with a strong tendency to recurrence which may be more diffuse than the original lesion." This definition excludes cases of solitary ulcers of the jejunum or ileum, intestinal tuberculosis, chronic ulcerative colitis, chronic localized diverticulitis, and intestinal actinomycosis.

In discussing possible relations to other diseases, the author gives particular attention to ulcerative colitis, pointing out that opinions are sharply divided. He presents brief histories of 7 patients in this series, in whom a diagnosis of ulcerative colitis was entertained at some time during the course of the disease. There is evidence that in patients with classical Crohn's disease of the small intestine a diffuse colitis, generally right-sided and resembling nonspecific ulcerative colitis, may develop, and these patients have been considered to be primarily cases of Crohn's disease. When obstruction or fistula complicates Crohn's disease, surgical treatment is indicated. Nothing was found to indicate the superiority of resection in 1 or 2 stages, short-circuiting, or short-circuiting with exclusion of the diseased segment.

Fifty-two of the patients in this series have been followed for more than 5 years, and 30 for more than 10 years. The recurrence rate in patients who had symptoms for more than 2 years before operation, and have been followed for more than 5 years subsequently, was 65%. When the history before operation was less than one month, nearly all the patients recovered permanently, only 12% having suffered a recurrence. When the history before operation was between 1 month and 2 years, 22% of the patients followed for more than 5 years developed a recurrence. In two-thirds of the recurrences, symptoms of recurrence commenced within a year of operation. Once the disease has recurred, it is unlikely to be brought permanently under control by medical or surgical means.

Congenital Coronary Arteriovenous Aneurysm: Clinical, Angiocardiographic and Physiologic Findings on Three Patients with Successful Surgical Correction. B. M. Gasul, E. H. Fell, M. Moreano and M. Weinberg Jr. A. M. A. Arch. Surg. 78:203-205 (Feb.) 1959 [Chicago].

The authors report on a 7-month-old male infant and on 2 boys, aged 5 and 9 years, with congenital coronary arteriovenous aneurysm draining into the right ventricle, in whom the aneurysmally dilated right coronary artery was successfully ligated and the aneurysm resected. The correct preoperative diagnosis was made in these patients by correlating the clinical findings with those of venous angiocardiography, retrograde aortography, and cardiac catheterization. Corrective surgical treatment is feasible for patients with this rare malformation.

The Surgical Treatment of Marginal Ulcer. J. M. Beal. Am. Surgeon 25:1-7 (Jan.) 1959 [Baltimore].

Two hundred four patients in whom a diagnosis of marginal ulceration was established were admitted to the New York Hospital from 1932 through 1957. Anastomotic ulceration followed gastrojejunostomy in 151 patients, and it was a sequel of partial gastrectomy in 53. The interval between the primary operation and the appearance of marginal ulceration varied from 2 weeks to 29 years. The peak incidence of secondary ulceration after both partial gastrectomy and gastrojejunostomy was within 1 year of the primary procedure, but in a significant number of patients who had undergone gastrojejunostomy stomal ulceration occurred more than 10 years later.

In 44 of the 151 patients who had undergone gastrojejunostomy, the marginal ulceration was managed without operation. The remaining 107 patients were subjected to a total of 324 surgical procedures. Dismantling of the anastomosis and partial gastrectomy were performed in 62 patients. A second partial gastrectomy was undertaken in 4 of this group for recurrent ulceration, and an additional patient had a transthoracic vagotomy. In 29 patients dismantling of the gastrojejunal anastomosis alone was performed. Resection was performed later in 16 of this group. Eight patients were treated by vagotomy. Later partial gastrectomy was performed in 3 of these. Miscellaneous procedures were employed in 8 patients. Four patients were subjected to revision of the gastrojejunal anastomosis. One patient had a bleeding vessel ligated through a gastrostomy; a gastrojejunocolic fistula was closed in one. The fistula recurred later and was treated by partial gastrectomy. Pyloric exclusion was accomplished in one patient. Recurrent ulceration appeared, and relief of symptoms was obtained by excision of the gastric antrum one year later. Jejunojejunostomy was performed in one patient. Six deaths occurred in the postoperative period—1 after dismantling and resection, 4 after simple dismantling, and 1 after vagotomy. Analysis of the results of treatment of marginal ulcer after gastrojejunostomy demonstrated that there are definite hazards whether conservative or operative treatment is employed. There were 8 postoperative deaths and 5 deaths caused by ulcer in the 107 surgically treated patients, a total mortality of 12.1%. There were 5 deaths from ulcer among the 44 patients treated without operation (11.3% mortality). However, only 4 of this latter group remained free of ulcer symptoms, whereas in the group of patients who were treated by surgical means after the appearance of stomal ulceration, 47 are considered well.

Nineteen of the 53 patients in whom stomal ulceration developed after partial gastrectomy received conservative management. The 34 patients who were treated surgically had a total of 104 operations. A higher resection was undertaken in 14 patients, with one postoperative death. Seventeen patients were subjected to vagotomy; in 13 a transthoracic approach was employed, and in 4 the vagus nerves were divided by subdiaphragmatic exposure. Miscellaneous procedures were carried out in 3 patients. Of the 19 who were treated by conservative methods, only 2 are free of ulcer symptoms, and 1 has died of complications from ulcer. Of the 34 patients treated by surgical procedures, 14 have remained well for 5 years or longer. Seven patients have been free of ulcer for less than 5 years. Three died from operative intervention in this group of 34 patients. Although the mortality rate was not significantly different for surgical and nonsurgical management, relief from recurrent ulceration was significantly greater in the surgically treated patients.

Dumping Syndrome: Recent Changes in Concept of this Common, Distressing, and Hence Important Postgastrectomy Development. J. W. Butin. J. Kansas M. Soc. 60:1-10 (Jan.) 1959 [Topeka].

Gastric surgery which bypasses or sacrifices the pylorus produces uncomfortable symptoms shortly after meals, called the dumping syndrome. These symptoms may be classified according to probable mechanisms of production as (1) mechanical and (2) vasomotor. Mechanical symptoms are characterized by abdominal fulness, nausea, and, at times, crampy abdominal pain followed by diarrhea. Vasomotor symptoms are characterized by perspiration and feeling of warmth, faintness, and tachycardia. In order to determine the true significance of the dumping symptoms, the author studied 94 consecutive patients who had undergone gastrectomy for benign disease at the Wichita (Kan.) Clinic between 1948 and 1955. The Billroth II operation had been carried out on 41 of the 94 patients, 25 of whom demonstrated dumping symptoms postoperatively; Billroth I operation had been performed on 14 of the 94, 7 of whom showed dumping symptoms after the operation, and the Hofmeister modification of Polya's operation had been carried out on 21, 13 of whom showed dumping symptoms after the operation. The type of operation was not known in 9 of the 94 patients with dumping symptoms. Thus, dumping symptoms were clearly recorded in 45 of the 94 patients.

Analysis of these patients revealed that neither the type of operation nor the amount of stomach resected seemed to reflect a relationship to the dumping syndrome. There is no means by which one can know preoperatively which patient will develop dumping symptoms, nor is there a way by which they can be effectively prevented by modification of the surgical procedure itself. Questionnaires were sent to the first 52 patients whose records contained possible complaints indicating existence of the syndrome. Thirty-six of these patients returned the questionnaires, complaining chiefly of the mechanical symptoms which occurred 30 minutes after eating; they were of the opinion that excessive food intake or excessive exercise after meals would produce these symptoms. Most common offending foods were dairy products, sweets, and any liquids taken with meals. Twenty-three of the 36 patients still had dumping symptoms at the time the questionnaire was filled out from 1 to 5 years after gastrectomy, and 18 of these patients indicated that the symptoms occurred often enough to be considered significant.

The most attractive theories of etiology of the syndrome are based on the relationship of osmotic pressures within the jejunum to those within the blood. The osmotic pressures can be increased by ingestion of foods which are hypertonic, especially if sufficient liquid is consumed to dissolve them. Such osmotic energy can be dispersed by vomiting, by diarrhea, or by reclining of the patient which produces a reflux of the meal into the gastric remnant. However, unless such dispersal of osmotic pressures occurs, a sudden shift of extracellular fluid from the blood to the jejunum results, which equalizes osmotic relationships between the 2 areas. The resultant decrease in blood volume is accompanied in certain individuals by a marked peripheral vasodilatation which results in pooling of blood away from the central areas, such as the heart and brain. The vast amount of fluid entering the jejunum itself produces distention and the mechanical phase of symptomatology, whereas the vasomotor symptoms are mediated through the autonomic nervous system, discharges of which seem to be initiated by acute changes in the circulating blood volume.

Satisfactory medical treatment of the dumping syndrome is based on dietary manipulation. Sweets, fluids, and dairy products are avoided with meals. Rest in the reclining position is advised after an unavoidably large meal. Small frequent feedings are preferable, especially in the early postoperative period. It is felt that apparent spontaneous improvement of the patient with the postgastrectomy syndrome usually reflects a process of self-education. The physician who understands the physiological mechanisms of this postgastrectomy syndrome can often lead his patients quickly to a remission of these troublesome symptoms.

Hirschsprung's Disease: Nine Years' Experience at the Hospital for Sick Children, Toronto. B. Langer and S. Thomson. Canad. J. Surg. 2:123-130 (Jan.) 1959 [Toronto].

While congenital megacolon (Hirschsprung's disease) has been recognized as a disease entity for well over 70 years, it is only in the past 15 years that a satisfactory concept of its etiology and treatment evolved. The authors review the development of the present concept of this disease, pointing out that it was not until 1948 that Swenson correlated the pathological findings with x-ray observations and, in addition, carried out motility studies. The primary defect is a congenital maldevelopment of the innervation to the undilated segment of the intestine, which is recognizable on pathological examination by absence or scarcity of ganglion cells in the myenteric plexus, and is usually accompanied by an increase in the number of nonmyelinated nerve fibers. Swenson stated that this defect in innervation was responsible for the failure of this part of the intestine to expand or transmit peristaltic waves in a normal fashion, thus producing a physiological obstruction with resulting proximal dilatation and hypertrophy. With recognition of the aganglionic segment as the diseased part of the intestine, Swenson also developed a method of excising it as far as the anus and of anastomosing ganglion-containing intestine to anus by a pull-through procedure. This operation has now replaced all other procedures in the treatment of the disease.

The authors report studies on 58 children with Hirschsprung's disease observed at the Hospital for Sick Children at the University of Toronto from 1949 to 1958. The diagnosis was verified in most of these children on the basis of pathological material. As in other reported series, there was a marked predominance of males (46 boys and 12 girls). The age at which symptoms brought these children to the hospital for the first time varied from 1 day to 6 years. The problem of diagnosis in the newborn infant is reflected in the fact that, of the 20 children seen during the first week of life, the correct diagnosis was made within a week of admission in only 5. Of the remaining 15, the condition of 5 was recognized at postmortem examination, and that of 10 was diagnosed after a period varying from 2 weeks to 6½ years. The provisional diagnoses included unspecified intestinal obstruction, meconium ileus, congenital anal stenosis, gastroenteritis, and pyloric stenosis. There were 20 deaths, but only 8 were postoperative deaths; 4 of these 8 children were moribund at the time of operation. Twelve of the 13 patients who were not subjected to a suitable operation died. With a better understanding of Hirschsprung's disease, the diagnosis is being made with greater frequency and earlier in the course of the disease. The main adjuncts to clinical diagnosis are special x-ray methods of visualizing the colon and pathological examination by rectal biopsy.

Surgical treatment is advisable in all cases. At the authors' hospital the first pull-through procedure was done in 1949, and since then a total of 22 patients with Hirschsprung's disease proved by pathological examination have undergone operation. The age at time of operation varied from 1 month to 11 years. In the early 1950's the pull-through operation was a primary procedure, without preliminary colostomy, at any age from one month on, if the patient's condition permitted. During recent years the practice has been to perform a primary pull-through operation only on older children (over 2 years of age) who are in good condition. On all others a preliminary defunctioning colostomy is done above the aganglionic segment, the definite operation being delayed until the infants reach at least 20 to 25 lb. in weight.

NEUROLOGY & PSYCHIATRY

Attempt at a Classification of Postoperative Deliriums: A Physiopathological and Therapeutic Synthesis. P. Chalnot, P. Michon, J. Sommelet and others. Semaine hôp. Paris 35:8-12 (Jan. 4) 1959 (In French) [Paris].

The authors differentiate between the postoperative delirium associated with alcoholism (delirium tremens), which is usually related to alcohol withdrawal and possibly to hyperkalemia, and the postoperative deliriums which are essentially connected with hydroelectrolytic disorders occurring in nonalcoholic subjects. Study was carried out by means of clinical data, biological values, and determination of neuromuscular excitability in 18 patients. In postoperative delirium tremens, a widespread neuromuscular hyperexcitability, in which muscle is more excitable than nerve, was consistently found. It is probable that hyperkalemia with cellular hyperhydration constitutes the most important biological fact in postoperative delirium tremens.

The varieties of postoperative delirium which are connected with metabolic hydroelectrolytic disturbances are as follows: delirium with extracellular dehydration, hypokalemia, and cellular sodium intoxication; delirium with extracellular dehydration, increased osmotic pressure, and excessive electrolytes in the blood; delirium with cellular hyperhydration and water intoxication, which is usually the result of an excessive and badly directed treatment; delirium with multiple electrolytic losses and preponderant sodium loss; delirium with alkalosis; and delirium with multiple deficiencies. These distinctions between types of delirium allow use of an adapted therapy. Any therapy not explicitly directed risks being not only inefficacious but also dangerous. True postoperative delirium tremens reacts well to the anesthetic steroid, hydroxydione sodium succinate (Viadril). Correct hydration, sufficient caloric support, and administration of strong doses of vitamin B_1 and magnesium sulfate are associated with this therapy. For electrolytic disturbances the authors use a combined preparation of levulose, insulin, and potassium, or hypertonic salt solutes and desoxycorticosterone acetate, or a reduced water intake according to the case.

There is always the possibility that different varieties of postoperative delirium will succeed each other in the same individual. Therefore, a daily water balance and often a series of apparently contrasting therapies are necessary. Research should continue along the lines of clinical study, evaluation of electrolytes in the serum, water balance, and determination of neuromuscular excitability.

Central Pontine Myelinolysis: A Hitherto Undescribed Disease Occurring in Alcoholic and Malnourished Patients. R. D. Adams, M. Victor and E. L. Mancall. A. M. A. Arch. Neurol. & Psychiat. 81:154-172 (Feb.) 1959 [Chicago].

The authors report on 3 alcoholic patients (2 men, aged 38 and 43 years, and a 29-year-old woman) and on a severely malnourished 53-year-old woman with a single pathological entity for which the term "central pontine myelonolysis" was chosen. These patients had been admitted to the Boston City Hospital where they died. Autopsy revealed a single, sharply outlined focus of myelin destruction, which was localized in the rostral part of the pons and indiscriminately affected all the fiber tracts. The axis cylinders and nerve cells were largely spared, and there were no inflammatory or vascular changes. The process probably began in the central portion of the pons and spread in a centrifugal manner, disposing itself symmetrically about the midline. In the 38-year-old man and in the 29-year-old woman with the largest lesions, the disease had manifested itself clinically by a pseudobulbar palsy and rapidly evolving flaccid quadriplegia, with weakness of the face and tongue and an inability to speak and swallow, leading to death in about 13 and 26 days. In the other 2 patients there were no symptoms referable to the lesions, presumably because of their small size. The condition did not resemble vascular diseases of the brain stem, Wernicke's superior hemorrhagic polioencephalitis, degeneration of the corpus callosum (Marchiafava-Bignami's disease), multiple sclerosis and related disorders. No reference to a disease of the described type has been found in the medical literature of the past 75 years.

The causation of central potine myelinolysis is unknown. Occurring on a background of alcoholism and malnutrition, the nature and location of the disease favor either an exogenous or an endogenous intoxication, or a deficiency of some substance essential to the metabolism of nerve tissue. This hitherto undescribed disease deserves a special name because of its unique clinical and pathological features; it has been designated as central pontine myelinolysis because this term denotes both the specific anatomic localization of this disease and the remarkable unsystematic dissolution of medullated fibers. This description seems preferable to pontine demyelination for 2 reasons. First, demyelination appears to represent only one phase in the course of this disease. In the central part of each lesion, what had begun as a demyelinative process eventually resulted in a destruction of all elements, even the supporting tissues, with resulting cavitation. Second, the term "demyelination" has been applied to a diversity of diseases, usually connoting multiple sclerosis and related disorders, and therefore has come to lack precision.

GYNECOLOGY & OBSTETRICS

Mesenchymal Sarcoma of the Uterus. W. B. Ober and H. M. M. Tovell. Am. J. Obst. & Gynec. 77:246-268 (Feb.) 1959 [St. Louis].

One of the authors had suggested in a previous study a four-group classification of uterine sarcoma: (1) leiomyosarcoma, (2) mesenchymal sarcoma, (3) blood vessel sarcoma, and (4) lmyphoma. In this paper the authors excluded all leiomyosarcomas, the most frequent form of uterine sarcoma. The total of 29 cases, on which this report is based, included, in addition to 26 cases of mesenchymal uterine sarcoma, 1 case of hemangiosarcoma and 2 of lymphoma. The 26 cases of mesenchymal sarcoma, of which 25 were followed up, are classified into 4 categories according to whether their cellular components are pure, mixed, homologous, or heterologous in origin. "Pure" sarcoma signifies one composed of one cell type only; "mixed," composed of more than one cell type; "homologous," containing tissue elements indigenous to the uterus; "heterologous," containing tissue elements foreign to the uterus. Irrespective of cell composition, all members of this family of tumors can be traced to an origin from derivatives of the mesenchyme of the urogenital ridge, specifically that derived from and surrounding the epithelium of the Müllerian duct.

The pure homologous sarcomas occur in younger women, often premenopausal; they grow slowly, metastasize late, if at all, and pursue an indolent clinical course. Total hysterectomy followed by radiation therapy, as indicated, affords a reasonable prognosis for a long-term survival. The pure and the mixed sarcomas, whether homologous or heterologous, occur in older women, usually postmenopausal; they grow rapidly, metastasize widely, and afford limited opportunities for treatment with hope of cure. Over 50% of patients with these varieties of sarcoma die within 2 years, and less than 10% can be listed as 5-year survivals. The majority of survivors in this group have tumors which are polypoid and exophytic and invade the underlying myometrium superficially, if at all.

Metastases in cases of carcinosarcoma were usually of the carcinomatous component. In one patient the metastasis contained admixed carcinomatous and sarcomatous components. In another patient there was dissociation of the cellular components in the metastases, the ovary containing metastatic adenocarcinoma and a vaginal nodule containing pure metastatic sarcoma. In 10 of 25 cases a prominent clinical feature was a large polypoid mass protruding through a dilated cervical os in a postmenopausal woman whose presenting symptom was uterine bleeding. To some extent, length of survival was correlated with duration of symptoms prior to treatment. Excluding the pure homologous sarcomas, in 14 patients who are dead, the average duration of symptoms was 9.6 months, and the average survival time was 8.2 months; in 7 patients alive at the time of reporting, the average duration of symptoms was 2.3 months, and the average survival time was 39.6 months.

Treatment of patients with carcinosarcoma or mixed mesenchymal sarcoma must depend upon the extent of the disease at the time of diagnosis. If the tumor is polypoid and confined to the endometrium or has only superficially invaded the myometrium, total abdominal hysterectomy with bilateral salpingo-oophorectomy is sufficient. With extension beyond these limits, the prognosis is generally poor, and a course of supervoltage irradiation to the pelvis for palliative purposes is indicated. No results are reported with patients treated by radical hysterectomy, exenterative surgery, or chemotherapeutic compounds. The prognosis appears to be hopeless in the presence of extrapelvic disease.

The Histogenesis of Carcinosarcoma (Mixed Mesodermal Turmor) of the Uterus as Revealed by Tissue Culture Studies. A. Rubin. Am. J. Obst. & Gynec. 77:269-274 (Feb.) 1959 [St. Louis].

The histogenesis of carcinosarcoma of the uterus is obscure. Hence, because of divergent points of view, the study of carcinosarcoma grown in tissue cultures, where elements of exudation, inflammation, compression of cells, vascularity, tumor bed, and host response are absent, seemed to be a logical technique for attempting to learn more about such tumors. The author presents the history of a 57-year-old woman from whom a carcinosarcoma (mixed mesodermal tumor) of the uterus was removed. Two and one-half months after the operation the patient complained of vomiting and weight loss. Large abdominal masses were palpable. In the midvagina there were several friable, polypoid lesions. A similar mass protruded from the urethral meatus. Biopsy specimens of the vaginal and urethral tumors were used to prepare tissue cultures and microscopic sections. The microscopic picture was identical with that of the original uterine lesion. The patient was readmitted and given a course of nitrogen mustard intravenously. The abdominal mass appeared to grow smaller. No effect upon the urethral or vaginal lesions was noted. The patient died 4 months after hysterectomy.

In the tissue cultures prepared from biopsy specimens, 2 distinct cell types were distinguished. One cell type had the characteristics of carcinoma, the other of sarcoma. No intermediate cell types of evidence of transition from one form to the other were seen. These observations lend support to the thesis that carcinosarcoma is a distinct pathological entity in which carcinomatous and sarcomatous elements coexist, rather than merely an atypical or pleomorphic carcinoma. This is the first description of a human carcinosarcoma grown in tissue culture.

Syphilitic Foetus After Prenatal Penicillin Therapy. J. A. Burgess. Brit. J. Ven. Dis. 34:240 (Dec.) 1958 [London].

The prevention of congenital syphilis by the treatment of syphilitic pregnant women has been so successful that clinical manifestations of the disease in infants, after adequate prenatal penicillin therapy, are now seldom seen. In a 32-year-old woman, who attended an antenatal clinic, serological tests for syphilis were positive, the first positive report being obtained during the 16th week of pregnancy. Fetal movements ceased during the 21st week. Crystalline sodium penicillin in a daily dose of 1 million units was given for 15 days, beginning with the 22nd week of pregnancy. In the 27th week miscarriage of a macerated fetus occurred. A postmortem examination of the fetal liver, stained by Levaditi's method, showed the presence of numerous spirochetes which had the morphology of Treponema pallidum. Examination of the husband showed that he had late latent syphilis. It is suggested that antisyphilitic treatment should be given immediately to expectant mothers in whom the initial serologic tests for syphilis are unequivocally positive.

Vaginitis and Pathological States of Newborn Infants: Etiology of Infection with Staphylococci in Newborn Infants. J. Bret and C. Coupe. Presse méd. 67:216-217 (Jan. 31) 1959 (In French) [Paris].

Cultures were obtained from the vaginal canal of 300 parturients and from the nasal cavaties, mouths, and urine of their newborn infants so as to investigate possible transmission of pathogenic micro-organisms at delivery. Cultures were recovered from 200 women at delivery and from their newborn infants at birth and 6 hours, 24 hours, and 4 days after birth. Cultures were recovered from the remaining 100 women at admission and at delivery and from their newborn infants 24 hours, 4 days, 10 days, and 26 days after birth. Staphylococcus pyogenes var. aureus was recovered in the cultures of 46 women (15%) at delivery. Thirty-seven newborn infants (12%) were found to carry staphylococcus organisms at birth and 10 days afterwards. These organisms were present alone in 10 instances and were associated with either gram-negative bacteria or Candida albicans in 17 instances. Consequently, 37 of 46 mothers (or 82%) who carried pathogenic organisms at delivery transmitted them to their newborn infants. In 9 instances, in which labor was of short duration or in which a cesarean section was performed, the newborn infants were free of pathogenic organisms, although the organisms were present in the mothers. The presence of staphylococci was not observed in those infants whose mothers' vaginas were free of these organisms. Of 100 infants who were inspected on discharge, pathogenic micro-organisms were present in 27; 12 of them were infected at birth, and 15 after birth. This means that 47% of the infections took place at delivery.

Spontaneous disappearance of Staph. pyogenes var. aureus was observed in 4 infants (27%), and of C. albicans in 10 (60%). Of 14 infants who still carried pathogenic organisms 4 days after birth, 7 were affected with the following pathological states: purulent conjunctivitis (2), subcutaneous abscess (1), purulent rhinitis (1), parotitis attributed to staphylococci (1), and suppurative omphalitis (2). The micro-organisms observed in the foci of infection of these infants were of the same type as those identified in their respective mothers at delivery. To prevent transmission of pathogenic micro-organisms from parturients to newborn infants, prophylaxis and treatment for vaginitis of pregnant women, coupled with rigid control of nursery sterility, are recommended.

Sarcoma of the Uterus: A Report of 34 Cases. E. J. Crawford, Jr. and R. Tucker. Am. J. Obst. & Gynec. 77:286-291 (Feb.) 1959 [St. Louis].

This study was undertaken to correlate the clinical findings, diagnosis, management, and ultimate outcome in 34 patients with uterine sarcoma, who were seen during the 9-year period from 1948 to 1956 at 2 hospitals in Shreveport, La. One of the hospitals is a charity institution and a referral center; the other is a private hospital. Sarcomas constituted 2.6% of all uterine malignancies. Twenty-six of the patients had leiomyosarcoma; in 6 the leiomyosarcoma was primary (arising in the myometrium), and in 20 it was secondary (arising in a myoma). Of the other 8 patients, 3 had endometrial stromal-cell sarcoma, and 5 had mixed mesodermal tumors. The average age of the patients with leiomyosarcoma was less than 50 years; for those with the other 2 forms of sarcoma it was over 67 years. The majority of the patients had the triad of irregular bleeding, abdominal mass, and lower abdominal pain. These symptoms are not characteristic and are similar to those of other benign and malignant diseases of the uterus. The only preoperative diagnoses were made from curettement or biopsy. Two patients had tumors of the cervix, and diagnosis was made from biopsy. Two other patients had necrotic tissue in the vaginal vault, from which diagnosis was established. A diagnostic curettage was done 8 times in the patients with leiomyosarcoma; 3 cases were reported positive. In the endometrial stromal type the curettement yielded a positive diagnosis in all cases. In the mixed mesodermal tumors a curettement was done in 2 cases, and both were positive. The diagnosis of leiomyosarcoma was usually made on histological examination of the surgical specimen.

Three of the 26 patients with leiomyosarcoma were found to have inoperable disease. Sixteen of the remaining 23 patients were treated by total abdominal hysterectomy; 7 of them died, and 9 are living from 2 to 8 years after the hysterectomy. Of the 6 patients who underwent subtotal hysterectomy, 4 are dead, and 2 are alive more than 5 years after the operation. One patient who was treated by vaginal hysterectomy is still alive (3 years later). Operation was the treatment of choice. The operative mortality was 3.8%. Irradiation was of doubtful benefit. The extent of the tumor was the most important factor in prognosis. All the patients in whom the sarcoma extended outside the uterus are dead. Earlier diagnosis may possibly increase the survival rate. The 5-year survival rate in this series was 26.5%. There were no 5-year survivors in the endometrial stromal-cell and mixed mesodermal groups. The leiomyosarcoma arising in a fibromyoma seems to be the most favorable type of sarcoma.

PEDIATRICS

The Relationship Between Bronchiolitis and Childhood Asthma: A Follow-up Study of 100 Cases of Bronchiolitis. H. J. Wittig and J. Glaser. J. Allergy 30:19-23 (Jan.-Feb.) 1959 [St. Louis].

The high incidence of respiratory allergies in children with a history of bronchiolitis could be of significance for an etiological relationship between bronchiolitis and asthma. This prompted the authors to study 100 children with acute bronchiolitis admitted to the pediatric services of 3 major hospitals in Rochester, N. Y., between 1950 and 1957. The patients' ages ranged from 4 weeks to 4 years. Seventy-six patients were under the age of one year. The purpose of this study was to ascertain in how many of these 100 children bronchial asthma or other respiratory allergies developed subsequently and how many had a positive family history for allergy. Studies of hospital records and communication with the patients' families and their private physicians indicated that in 32 children bronchial asthma and in 17 upper respiratory disorders, perennial allergic rhinitis, or pollinosis developed subsequently. The diagnosis of asthma in the 32 children was made between 1½ and 2½ years after their original admission to the hospital with acute bronchiolitis. A reliable family history was available for only 83 of the 100 patients; 37 of these showed incidence of either asthma, pollinosis, or eczema. It seems fair to assume that acute bronchiolitis in infancy should be looked upon as a condition which is often followed by the development of respiratory allergic disease, particularly asthma, and appropriate prophylactic measures should be instituted.

Disturbances of Acid-base Equilibrium in Salicylate Intoxication. R. W. Winters, J. S. White, M. C. Hughes and N. K. Ordway. Pediatrics 23: 260-285 (Feb.) 1959 [Springfield, Ill.].

The 33 patients with salicylate intoxication reported ranged in age from 2 months to 19 years, but most of them were 3 years of age or less. Salicylate had been taken in the form of aspirin by 31 of the patients and in the form of methyl salicylate or phenyl salicylate by 1 patient each. In 16 instances the salicylate was accidently ingested; a 19-year-old girl had ingested aspirin in a suicidal attempt; in the remaining 16 persons poisoning resulted from therapeutic overdosage in the treatment of febrile respiratory infection, acute rheumatic fever, or rheumatoid arthritis. The total carbon dioxide content of the blood and the carbon dioxide tension (pCO_2) of the plasma were significantly reduced in nearly all the patients. The pH of the blood did not vary consistently: some patients were alkalotic, others were acidotic, while still others had no significant deviation in pH of the blood. There was evidence that many patients had a mixed disturbance in acid-base equilibrium, with primary disturbances in the metabolic and the respiratory components.

The nature of the metabolic acidosis was analyzed by a detailed study of the anions in the serum of 5 patients with this disturbance. A variety of anions, such as chloride, salicylate, and an undetermined anion, were present in excess; in one patient the concentration of phosphate was likewise elevated. There are indications that ketone bodies account largely for the undetermined anion fraction. The return to normal acid-base equilibrium was studied in 6 patients who presented with an acid pH. This group showed a tendency to recover through a point at which the pH of the blood was normal or even alkaline although the carbon dioxide tension was still low.

In 2 patients who initially presented with an acid pH, acute respiratory depression supervened after acute pulmonary edema. The respiratory depression was accompanied by a marked elevation of the carbon dioxide tension and a marked fall in the pH. One of these patients died; in the other ventilation was achieved by artificial means, and recovery resulted. The authors review the basic effects of toxic doses of salicylate: respiratory stimulation, changes in the metabolic rate, and disturbances in the metabolism of carbohydrate, protein, and fat. The pathogenesis of the acid-base disturbances is formulated in terms of these actions of toxic amounts of salicylate. Several factors may be important conditioning influences in the particular type of disturbance which develops in an individual patient. These factors are the age of the patient, duration of intoxication, type of intoxication (i. e., whether accidental or the result of therapeutic overdosage), and, perhaps, the amount of salicylate ingested.

Evaluation of the Efficacy of Lavage and Induced Emesis in Treatment of Salicylate Poisoning. F. J. Arnold, J. B. Hodges and R. A. Barta. Pediatrics 23:286-301 (Feb.) 1959 [Springfield, Ill.].

Since the authors recovered only minimal amounts of salicylate by gastric lavage in children with aspirin (acetylsalicylic acid) poisoning, they made experiments in dogs to ascertain the therapeutic value of gastric lavage and to compare it with the effect of emesis. Fasting dogs, 6 to 10 kg. in weight, were given sodium salicylate in tablet form in doses of 0.5 Gm. per kilogram of body weight, and lavage was performed or emesis induced at varying time intervals after ingestion. The lavage and emesis fluids were examined for the amounts of salicylate they contained.

It was found that in the recovery of the ingested salicylate the initial aspiration of the stomach before the introduction of the lavage fluid is equally as important as the succeeding lavage. Lavage carried out within 15 minutes is no more effective than emesis induced within 30 minutes of ingestion. Lavage carried out one hour after ingestion is inefficient and far less effective than emesis produced within the same time interval. Spontaneous emesis is not as effective as induced emesis. Emesis induced immediately, or even when delayed as long as 1½ hours after ingestion, appeared to be the more effective, and thus the preferable, form of therapy. Neither lavage nor emesis under the most optimal conditions was consistent in effectiveness, so that all patients after either form of therapy should be watched carefully for signs of increasing drug intoxication and should be treated if a specific form of therapy is available.

Serial Study of Bone Marrow in Hemolytic Disease of the Newborn (Erythroblastosis Fetalis). H. C. Dillon and W. Krivit. Pediatrics 23:314-322 (Feb.) 1959 [Springfield, Ill.].

Fourteen infants with erythroblastosis fetalis were studied, with particular reference to bone marrow activity and its relation to their anemia. Serial studies of the marrow were done in 12 of the 14 infants, and single specimens were examined in 2 infants. The purpose of this study was to determine the relationship between the degree of anemia and the normoblastic activity of bone marrow, as ascertained by morphologic techniques. On the basis of literature reports and the observations in this series of infants, true "aregenerative anemia" appears to be a rare occurrence. To suggest that the anemia of erythroblastosis is commonly due to a cessation of erythropoiesis seems totally unjustified, because these infants show hyperplasia of the marrow which is analogous to that seen in other compensated hemolytic anemias.

Hyman and Sturgeon had stated, and the authors agree, that a relative hypoplasia may occur as cell destruction exceeds cell production. This does not necessarily imply marrow failure or an "aregenerative state," but it may indicate that the balance can be in favor of blood destruction, and an anemia of some degree is the result. In a previous report, infants after exchange transfusion did show excessive destruction of donor erythrocytes. The rate of destruction of Rh-negative cells in erythroblastosis fetalis was twice that of normal. Some of the cases reported in the literature as "aregenerative anemia" lack adequate marrow studies and cannot be accepted as proved. It should be emphasized that it may be unwise to conjecture about the activity of the bone marrow from reticulocyte studies of the peripheral blood alone. In this series, the percentage of normoblasts in the bone marrow was increased in proportion to the degree of anemia.

The Problem of Early Diagnosis of Purulent Meningitis in the Nursling. G. Rottini. Minerva pediat. 10:1388-1398 (Nov. 24) 1958 (In Italian) [Turin, Italy].

The time of onset of various symptoms of purulent meningitis was studied in 51 nursing infants, 3 days to 12 months old, who were observed during a 5-year period. The significant symptoms of the disease had developed by the 4th or 5th day of illness. A temperature of 39 C (102.2 F) or over appeared on the first day in 23 children; in 10 children the temperature was 38 to 39 C (100.4 to 102.2 F), and in 10 others it was 37 to 38 C (98.6 to 100.4 F). Fever was most frequent in those close to one year of age. Early symptoms of intracranial hypertension appeared in a pattern inversely proportional to the ages of the children; on the first day these symptoms were most frequent and marked in infants, 9 to 12 months old; by the 4th or 5th day they had developed in most of the children. Early symptoms of meningeal irritation were most frequent in infants, 9 to 12 months old; second in frequency were the meningeal symptoms of infants ranging in age from birth to 3 months, followed by those in the age groups of 3 to 6 months and 6 to 9 months. Symptoms of brain involvement were most frequent in the youngest children, being present in 60 to 75% of the children within the first 48 hours of illness. The frequency of early symptoms of neurovegetative involvement increased in a pattern directly proportional to the ages of the children; 10 of the youngest children refused food on the first day of illness, and by the second day one-third of the children refused to eat. The author observed an almost constant association of symptoms of cerebral involvement and of purulent meningitis in these infants.

Still's Disease and Its Nosologic Limits. G. Verdura, N. Svilokos and L. Serafini. Minerva pediat. 10:1251-1267 (Nov. 10) 1958 (In Italian) [Turin, Italy].

The authors report on a boy, 4 years of age, with Still's disease. The first episode of the disease, consisting of high intermittent fever and rash, appeared at the age of 11 months. These symptoms recurred intermittently for a few days once a week. Early signs of fixation in flexion of the hands and legs were interpreted as manifestations of spasmophilia and, then, of arthritis. Administration of preparations of calcium, antibiotics, and antipyretics brought no benefit to the child. The subsequent signs and symptoms were progressive pallor, stationary body weight, and failure to develop walking capacity. A pleurisy with effusion was roentgenologically identified and cured in a few weeks. After 2 months of apparent improvement, when the child was 19 months of age, an episode of high fever, enlargement of the vertebrae in the lower section of the spinal column, pain on passive flexion, a marked degree of anemia, and deterioration of the general condition developed. The child was then referred to the clinic, with which the authors are associated, with the diagnosis of spondylitis. On admission the child appeared dystrophic, with very pale, inelastic skin, enlarged joints, muscular atrophy, fixation in flexion of the legs, enlarged and painless spleen, enlarged penis and scrotum but with testes normal in size. During hospitalization the child received successive therapies with antibiotics as well as Butazolidin, prednisone, and corticotropin (ACTH). Each therapy brought about slight improvement of the symptoms but failed to arrest recurrences. The therapy with isonicotinic acid, administered in daily doses of 20 mg. per kilogram of body weight for 10 months, arrested the recurrence of the disease and produced remission of all symptoms with the exception of a slight rigidity of head movement.

UROLOGY

Wilms's Tumor: A Report of 71 Cases. J. K. Lattimer, M. M. Melicow and A. C. Uson. J. Urol. 80:401-416 (Dec.) 1958 [Baltimore].

Wilms's tumor (nephroblastoma), one of the commonest neoplasms in childhood, apparently needs no longer be regarded as a hopeless disease. This is suggested by the findings in this review of 71 cases (67 proved), from the files of the pediatric urologic service of the Squier Clinic and the Babies Hospital in New York, from 1895 through 1956. "Abdominal mass" was the presenting symptom in 60% of the patients. Vomiting, abdominal pain, fever, or hematuria occurred in some of the children. Hypertension was found in 60% of those patients in whom the blood pressure was recorded. The erythrocyte sedimentation rate was determined in 20 patients, and of 11, in whom the range was high (35 to 90 mm. during the first hour), none survived. The urographic study was the most important single procedure in confirming the clinical impression of nephroblastoma.

Of the 25 patients treated before 1934, only 2 survived, whereas of the 42 treated between 1934 and 1956, 16 have survived 2 years or more. Preoperative irradiation proved unsatisfactory in the 4 patients in whom the full course was given. Better results were obtained with prompt nephrectomy and postoperative irradiation. Thirty-six of the last 42 patients were treated by nephrectomy, and of these 16 survived, 5 surviving so far from 2 to 5 years, 5 from 5 to 10 years, and the remaining 6 from 10 to 23 years. Patients who survived beyond 2 years usually continued to do well. Eighty-five per cent of the children who died after nephrectomy for nephroblastoma succumbed within 2 years.

The age of the patient at the time of surgery was an important factor in prognosis. Of those operated on during the first 2 years of life, 73.3% are alive, whereas only 18.5% of those operated on between the ages of 3 and 9 years are alive. Other factors important for a favorable prognosis were location of the tumor at the lower pole of the kidney, removal of the tumor with the capsule intact, and the absence of invasion or metastases. The prognosis was unfavorable when the child was older, when the tumor was on the upper pole, when the capsule was torn or had been penetrated by the tumor, when invasion or metastases were present, and when the erythrocyte sedimentation rate was above 35mm. during the first hour.

Aneurysm of Renal Artery: Report of Five Cases. B. R. Harrow and J. A. Sloane. J. Urol. 81:35-41 (Jan.) 1959 [Baltimore].

Since previous presentations, including comprehensive surveys, have discussed the etiology, symptomatology, and pathogenesis of aneurysm of the renal artery, the authors in this report add 5 new cases of saccular aneurysms, consider the indications for aortography, and discuss the treatment. Calcific shadows typical of renal artery aneurysms were observed in all 5 patients. In 1 of the 5 patients the aneurysm developed in a solitary kidney, the third instance of this sort reported in the literature. In another patient in whom an excretory urogram revealed 2 small calcific rings, 0.5 and 1.1 cm. in diameter, in the upper pole of the right kidney, suggestive of 2 renal artery aneurysms, a translumbar aortogram confirmed the diagnosis.

Noncalcified aneurysms of the renal artery have a high incidence of rupture, as proved by a survey of the literature. The noncalcific lesion is diagnosed only by aortography, operation, or autopsy. It has been discovered preoperatively with the use of translumbar aortography for hypertension, poorly or nonfunctioning kidneys, or unexplained extra renal or intrarenal noncalcified, space-occupying lesions. Operative intervention to prevent rupture and other complications is necessary in patients with nonopaque saccular aneurysms. Contrary to many previous reports, the authors believe that operation may be unnecessary with large and small calcified aneurysms in asymptomatic, normotensive, elderly individuals. Surgery is indicated if pain, hematuria, hypertension, or renal impairment occurs, and in youthful or pregnant patients.

With regard to aortography in the diagnosis of calcific rings, the authors say that the typical cracked-eggshell appearance of the usual ring shadow, located in the renal hilus on anteroposterior and oblique views, is so characteristic that usually aortography is unnecessary for diagnosis. With an atypical calcification, translumbar aortography is necessary to distinguish among aneurysms, calcified lymph nodes, cysts, neoplasms, old traumatic hematomas, and tuberculomas. The serious complications that have been known to occur in translumbar aortography can be avoided if the proper technique is employed. The authors demonstrate also that the intelligent use of adequate, closely supervised application of pressure to the abdominal wall during intravenous urography often eliminates the necessity of retrograde pyelography.

INDUSTRIAL MEDICINE

Long-Term Experience with Beryllium Disease: A Report of Twenty Patients. E. M. Kline and T. W. Moir. A. M. A. Arch. Indust. Health 19:104-109 (Feb.) 1959 [Chicago].

A report is presented on 20 patients with chronic beryllium disease who were followed up for 5 years. There were 7 men and 13 women, ranging in age from 25 to 44 years. Five persons were employed in the mixing and firing of zinc beryllium silicate lamp phosphor, and were exposed not only to zinc beryllium silicate but also to the dusts of beryllium oxide. Fifteen persons were employed in lamp factories where the fluorescent tubes were coated, lehred, based, inspected, and packaged for distribution to the consumer; the exposure of these persons was minimal. The data collected indicate that there was not only a quantitative but also a qualitative difference in exposure between the 2 groups. In the first group the average duration of exposure was only 12 months, as compared with the second group whose average exposure in the lamp factories was nearly twice that time (23 months). The average latent period of 2.9 years for the group exposed in the chemical plants was approximately half as great as that for the group exposed during the lamp manufacturing process. The differences in the attack rate, in the duration of exposure, and in the period of delay between the 2 groups are not readily explained by a sensitivity reaction, as suggested by other authors, but are rather indicative of differences in quantity and form of the disease-producing substance of beryllium.

Five patients of the first group received no specific treatment; 2 died, and the other 3 are in a bad condition. The 15 patients of the second group were treated with corticotropin, corticosteroids, or a combination of these agents in an average daily dose of 75 mg. (ranging from 25 to 150 mg.) for an average period of 4.5 years (ranging from 0.8 to 7.5 years). Striking but only transitory improvement has been obtained with corticotropin (or with corticosteroids) in some patients. The favorable response was particularly impressive in patients with rapid weight loss, anorexia, dyspnea, and pulmonary infection. The subsequent course of the disease, however, was unpredictable from the initial favorable response to the treatment, and the duration of remissions was not always a result of treatment. In 4 of the 7 patients who showed improvement after treatment, the remission was maintained without therapy for a period of from 1½ to 3 years. No patient was cured either spontaneously or as a result of treatment. Five patients died; the death of 4 was attributed to berylliosis, and that of 1 to an unrelated disease. Four patients are sufficiently well to perform light housekeeping chores; 6 are partially disabled; in the remaining 4 the disease has been gradually progressive despite steroid therapy, adequate rest, limitation of physical activity, and other supportive measures.

Complications, such as hemoptysis, pneumothorax, and renal stones, were frequent in the series presented, but the development of cor pulmonale was the most serious threat and is now regarded as a poor prognostic sign. The chest roentgenograms showed characteristic changes in the early stage of the disease which are indicative of berylliosis. As the disease progresses, the findings become less specific, and the roentgenograms may lose all similarity to the original appearance.

The Pathologic Changes of Chronic Beryllium Disease. H. R. Dudley. A. M. A. Arch. Indust. Health 19:184-187 (Feb.) 1959 [Chicago].

The observations reported were derived from a review of 58 patients with chronic beryllium disease in the Beryllium Registry. The chronic reaction to beryllium compounds is similar in each organ involved. Whether directly introduced or vessel-borne, beryllium compounds precipitate a lymphocytic, plasma-cell, and granulomatous reaction in the skin, liver, kidney, lymph nodes, and skeletal muscle. The myocardium, the spleen, and the pleura may be involved. The most important route of entry to beryllium into the body is by inhalation, and, since the beryllium compounds industrially used are poorly soluble, the lungs are the most frequently and seriously affected. The chronic active disease may yield to a chronic more indolent state; the transition is often marked by the development of fibrosis and of vesicular emphysema with persistence of lymphocytes. Pulmonary emboli are frequent, in addition to the occasional endarteritic changes seen in the involved lungs. Approximately 25% of the patients reviewed from the Beryllium Registry had small emboli in the peripheral vessels. Pulmonary emboli constitute a hazard for any debilitated patient, and they can be expected to increase in frequency if polycythemia, caused by chronic anoxia, is added to the disease pattern. Showers of small emboli from the veins of the extremities may produce exacerbation episodes in the respiratory difficulties of these patients.

Medical Aspects of Civil Jet Air Transport Operations. K. G. Bergin. J. Aviation Med. 30:22-28 (Jan.) 1959 [St. Paul].

This report covers the civil operation of Comet jet aircraft over a period of 8 years. With the exception of the intermission in flying after the misfortunes of some years ago, the experience covers a wide range of operations over land and sea in tropical and temperate climates. A previously held conception that pilots for jet aircraft should be of the fighter pilot mentality has been proved to be misguided, and, by the same token, any arbitrary age limit of those competent to fly is not supported by experience. While reaction time may be slower in an older person, in the final analysis of reaction to conditions due weight must be given to the value of experience in any set of circumstances—the older and more experienced pilot carrying out his task with an economy of thought and action which is not available to his less experienced colleague. The pilot must be adaptable and prepared to adopt new techniques; he must be mentally alert; he must be more than usually ready to think and plan ahead; and, most important, he must be prepared to be a fully working crew member. Integrated teamwork on the flight deck is the key to successful jet operations. A pilot's reaction times must be swift, because he is working to a much shorter time scale, and his instrument flying must be exceptionally good, as instrumental approaches call for precision and accuracy. Careful preflight training and flight simulator work are important.

Jet aircraft and their flying technique do not require exceptional standards of physical or mental fitness. If anything, the danger is that their good flying characteristics could lead to a mistaken impression by nonflying executives that they are easier aircraft to fly than current piston-engine types. This view must not be allowed to gain credence. The operation of flight-time limitations, stacking at airports, fuel reserves, and the tiring effects of manual flying of such a sensitive aircraft, should the automatic pilot fail, must be given due consideration. The ideal pilot for operation of jet aircraft is one who is methodical and clear thinking, who has a mobile mind, and who fits in readily with a team. Good flight planning is required, and a high standard of training and indoctrination is most desirable.

THERAPEUTICS

Clinical Experiences with the Vitamin B_{12} Factors III and III_m in the Treatment of Pernicious Anemia.

G. Böwing and F. Thedering Jr. Blut 4:349-366 (Dec.) 1958 (In German) [Munich, Germany].

Numerous substances have been identified, which are chemically and biologically related to cyanocobalamin and which belong to the vitamin B_{12} group of substances. To classify the known vitamins of the B_{12} group, the authors survey the structure of the entire complex. A central cobalt atom is surrounded by 4 pyrrole rings, so that a porphyrin-like macro-ring system results. This system of rings contains 6 conjugated double-bonds. In the side-chains the basic ring is substituted with methyl groups, acetamide groups, and propionamide groups, and short and long side-chains are arranged in the same manner as in uroporphyrin III. One of the propionic acid chains, by way of an amide-bond, is connected with aminopropanol, the hydroxy group of which is esterified with the phosphoric acid rest of the nucleotide. In the chemistry of vitamin B_{12} a nucleotide is that portion of the vitamin B_{12} molecule that consists of an amidozole base, D-ribose, and phosphoric acid. A nitrogen atom of the base is connected with the cobalt atom like a secondary valence. This is important for the biological action. Depending on the groups coordinated with the cobalt atom, there are cyanocobalamin, hydroxycobalamin, nitrito-cobalamin, cyanato-cobalamin, thiocyanato-cobalamin, and others. A list of the complete nucleotide-containing "cobalamins" shows that factor III of vitamin B_{12} is hydroxybenzimidazole-cobalamin, and factor III_m is 5-methoxybenzimidazole-cobalamin.

The authors discuss what parts of the B_{12} molecule determine its biological action, showing the relation between chemical constitution and biological effects. Of 14 patients with decompensated pernicious anemia, they treated 4 with factor III and 10 with factor III_m of vitamin B_{12}. All achieved full clinical and hematological remissions. The effect on the blood picture, on the general condition, and on the spinal degeneration was the same as that of pure vitamin B_{12}, vitamin B_{12} plus folic acid, or liver extract. Primary treatment with the oral administration of factor III or factor III_m plus intrinsic factor is possible, but treatment by injection is more reliable. Maintenance treatment by means of factors III and III_m of 49 patients with compensated pernicious anemia achieved complete clinical and hematological control so far over an average period of 20 months. The patients reacted in the same way as they did earlier to treatment with liver extract, with vitamin B_{12}, or with vitamin B_{12} plus folic acid.

The oral administration of factors III and III_m requires more careful supervision of the patient because of the danger of recurrence in this as in other oral forms of therapy. The dosage of factor III or factor III_m is of about the same magnitude as that of vitamin B_{12}. Tolerance for factors III and III_m was favorable; no undesirable side-effects were observed. The authors conclude that factors III and III_m can be recommended for the treatment of patients with pernicious anemia.

Triamcinolone in the Treatment of Allergic Conditions.

L. H. Criep. J. Allergy 30:50-60 (Jan.-Feb.) 1959 [St. Louis].

The author reports the results of treatment with triamcinolone (Aristocort) in 250 actively allergic patients (119 men and 131 women) of all ages. Many patients presented more than one type of allergy, the duration of which varied from 1 to 10 years. The initial dose of triamcinolone was as follows: 206 patients received 16 mg. daily, 9 patients received 20 mg. daily, and 35 patients received 24 mg. daily. The dose of triamcinolone was reduced by 2 to 4 mg. a day every 1 or 2 days. The maintenance dose was 2 mg. daily in 155 patients. The drug was withdrawn gradually. No sodium-restricted diet or potassium was prescribed. The duration of treatment with triamcinolone ranged from 2 to 18 weeks. Usually other antiallergic treatment was continued during and after steroid medication, thus making it possible to employ smaller doses of triamcinolone.

Laboratory studies revealed no marked changes as a result of triamcinolone therapy in maintenance doses of 2 to 4 mg. daily. The hemoglobin level, hematocrit reading, and red blood cell count were unaffected. Eosinopenia occurred in 95 of 203 patients in whom the blood cell count was done. The chest roentgenogram was unaffected. In 4 patients glycosuria developed, and 5 patients showed a suggestive diabetic sugar-tolerance curve. No change in nonprotein nitrogen level was seen. There was no evidence of hypercalciuria or hypokalemia and no significant changes in total protein or gamma globulin values. Analysis of a metabolic study in 6 patients with bronchial asthma of long standing, who were given 18 to 24 mg. of triamcinolone, revealed only slight changes in urine sodium and calcium findings.

Triamcinolone is about 1½ times as potent as prednisone as an antiallergic agent and gives marked clinical relief. The frequency and severity of side-reactions are about the same as those observed with other synthetic steroids, except perhaps for fewer instances of hypertension and gastrointestinal manifestations. Most of the more serious side-effects occurred when the dose of the drug exceeded 10 mg. a day. Weakness, sweats, and muscle cramps were common side-effects found in this series. Sodium retention, potassium depletion, and edema were not observed after administration of triamcinolone in the dosages used. Triamcinolone commonly causes diuresis. A note of caution is included with reference to the use of triamcinolone and other steroids in the long-term treatment of allergy. Patients have to be examined regularly while taking the drug. Only the smallest dosage needed to keep a patient comfortable should be employed. Patients should be urged to be conservative in the use of the drug, and the possible dangers of long-term use should be explained to them. Most allergic patients do well with usual antiallergic therapy and do not need steroids.

Triamcinolone, as well as other corticosteroids, is indicated in the treatment of allergy only when it is used under the following conditions: (1) purely as a temporary measure in acute transient disorders, such as dermatitis due to poison ivy; (2) when it is impossible to control disabling manifestations, such as intractable bronchial asthma, in spite of complete medical and allergic treatment; (3) as a crutch during the period in which medical and allergic studies are being conducted if other forms of symptomatic therapy are inadequate; (4) in the absence of any of the well-known contraindications to steroids; and (5) as a lifesaving procedure in status asthmaticus. This therapy should be undertaken on a long-term basis only after a careful appraisal of potential dangers as well as benefits. It is not to be used as a substitute for careful medical and allergic treatment. Particular caution is to be exercised in the long-term treatment of allergic children.

Fluoxymesterone ("Halotestin") in Advanced Breast Carcinoma. B. A. Stoll. M. J. Australia 1:70-74 (Jan. 17) 1959 [Sydney].

The effects of fluoxymesterone (Halotestin) in a series of 50 patients with advanced cancer of the breast were studied at the Peter MacCollum Clinic, Melbourne. Fluoxymesterone was administered by the oral route in daily doses of from 15 to 20 mg. to less than one-half of the patients, and was given in daily doses of from 25 to 45 mg. to the remaining patients. Definite improvement was noted in patients with soft-tissue metastases to whom daily doses larger than 20 mg. were given. The response to the treatment was analyzed in 22 patients with cancer of the breast with metastases to the bone. Relief of pain was obtained in 18 patients (82%), and recalcification of metastases, without simultaneous roentgenotherapy, in 3; in 1 of the latter the recalcification of metastases was obtained after 6 weeks of treatment, and in the other 2 within 8 to 10 weeks of treatment. The duration of remissions effected in the majority of patients with metastatic breast cancer was 3 to 6 months only, but the favorable response was maintained for 9 months or longer in 3 patients. The results obtained with fluoxymesterone were similar to those observed from testosterone propionate.

Twenty-nine patients presented soft-tissue growth involving breast, lymph nodes, or cutaneous nodules; a favorable objective improvement was noted in 8 (27%), which was better than that observed from testosterone propionate. The best response was obtained in patients with primary growth, also in one patient with a recurrent tumor. The improvement has been maintained now for 6 months or longer in 3 patients, and they are still in remission although fluoxymesterone treatment has been discontinued. The 5 patients with pulmonary metastases showed no regression of lung opacities, and there was no reduction of the pleural effusion.

The urinary calcium levels were not in correlation with the clinical remissions: a fall in the urinary calcium excretion may occur (which is probably due to the calcium-retaining properties of fluoxymesterone), with no concomitant clinical improvement. On the other hand, 2 patients with persisting high urinary calcium levels showed marked remission of symptoms. Side-effects were, in general, few. It is emphasized that the greatest advantage observed in fluoxymesterone therapy was that even the administration of clinically effective doses caused little or no masculinization.

Clinical Evaluation of a New Sulfonamide with Prolonged Action. G. Fontana. Minerva med. 49:4726-4730 (Dec. 15) 1958 (In Italian) [Turin, Italy].

Forty-one patients, male and female, 16 to 71 years of age, with various inflammatory diseases of the respiratory tract were treated with Orisul [3-(*p*-amino-benzolsulfonamido)-2-phenyl-pyrazol], a new sulfonamide preparation with prolonged action. Each patient received 2 Gm. of the drug the first day, and 1 Gm. per day from the second day on. The 2-Gm. daily dose was continued for a few days in patients with the severe form of the disease. Good results were obtained in 27 patients; the fever dropped within 24 to 48 hours and the values of erythrocyte sedimentation, leukocytes, and $alpha_2$ globulins became normal. Fair results were obtained in 9 patients; improvement followed from 5 to 7 days after the beginning of treatment. No results were obtained in 5 patients, who had to be treated later with antibiotics. Twelve of 15 patients with acute bronchitis improved rapidly; the symptoms regressed in the same manner as if antibiotics had been used. The drug had a less beneficial effect in 5 patients with subacute bronchitis or chronic bronchitis which had become acute. Fair results, though, were obtained in 3 of these patients and good results in 2; discharge of mucus and elevation of temperature improved after a few days of treatment. The substitution of Orisul in patients who had received penicillin caused no change in the course of their improvement. The drug had an effect similar to that of antibiotics in 15 patients whose bronchopulmonary diseases were not too severe, but substitution or integration therapy with antibiotics had to be used in other patients with the severe form of these diseases. The drug was well tolerated by all the patients.

Gastroduodenal Perforations and Prolonged Steroid Therapy in Lipid Nephrosis. J. Cathala, C. Polonovski and M. de Boissière. Presse méd. 67:41-43 (Jan. 10) 1959 (In French) [Paris].

The authors describe 2 cases of lipid nephrosis, one in a 14½-year-old boy and the other in a 2½-year-old boy, which ended fatally after the patients were treated with long courses of prednisone (delta cortisone). Autopsy showed that the cause of death was unquestionably related to the occurrence of duodenal and gastric perforation. The authors state that the usual treatment of lipid nephrosis includes a daily dose of prednisone until edema and albuminuria have disappeared and plasma disequilibrium is corrected. Then there is a maintenance period in which prednisone is taken 3 or 4 days of the week for several months. The posology of the drug is uncertain, and many believe that it is necessary to reach a certain dosage level of effectiveness. This leads to increasing doses in difficult cases up to amounts which far exceed what would ordinarily be used, considering the weight and age of the patient.

The 14½-year-old boy had a recurrent attack of nephrosis and was in danger of cerebral accidents and anasarca. Abdominal symptoms appeared to be in direct correlation with the bout of nephrosis. A decision to use prednisone was not without realization of the patient's intolerance to the drug and of the fact that his father had an ulcer. It was decided that steroid therapy was necessary, and corticotropin (ACTH) was substituted for prednisone. The patient died during the night after the new treatment was begun. Anatomic examination revealed punctiform purpuric spots in the gastroduodenal mucosa and a perforation of the duodenum. Histological examination revealed ulcerations of the duodenum and stomach, which were characteristic of ulcerations of prednisone origin.

In the second patient an attack of severe abdominal pain was treated as a nephrotic attack. Altogether this boy had received 920 mg. of prednisone over a period of 51 days, being given up to 50 mg. per day although he weighed only 12 or 13 kg. (between 27 and 29 lb.). After an apparent cure, he was hospitalized again and given potassium chloride, penicillin, and a French steroid preparation (Cortancyl) for grippe. Three days later he died, after an abdominal attack, of what seemed to be nephrosis and hematemesis, and in shock. Anatomic examination showed isolated perforation of the posterior wall of the stomach. In both this and the first patient the painful abdominal syndrome did not appear to be of a nature other than that of previous abdominal episodes. Circumstances were not favorable for a precise diagnosis or surgical intervention in either patient.

The cause of the nephrotic abdominal syndrome is infection in most cases, but other mechanisms may be at fault. Anatomic or functional disturbances in the adenomesenteric system or vena cava and changes in the protein-lipid equilibrium of the plasma can play a role. The difficulty lies in deciding whether an abdominal attack is the result of an infection in a patient with lipid nephrosis or whether it is a mechanical accident which may be the consequence of treatment. Steroid therapy risks causing lesions of the digestive mucous membrane, ranging from erosions and ulcerations to hemorrhagic necrosis and acute perforation of an organ. The question of treatment is very difficult, since steroid therapy is at present well accepted and it brings much success. The authors think that this therapy should be limited to less prolonged periods. The original basic and maintenance treatments, which could last for 6 to 8 months, might be more suitably limited to 3 or 4 months. Perhaps some abandoned methods which had some success (for example, thyroid opotherapy) could be used with a rigorous and prolonged antibiotherapy. This might improve the prognosis of nephrosis and avoid the definite risk of perforation from steroid therapy. The distressing problem of treatment for lipid nephrosis remains to be solved. This practical difficulty is the consequence of lack of knowledge of the nature and etiology of the disease.

Disseminated Lupus Erythematosus: Analysis of Cases of 100 Patients Treated with Corticosteroids: Comparison with 25 Untreated Patients. J. Jalil M., R. Armas Cruz, J. Harnecker J. and others. Rev. méd. Chile 86:717-732 (Dec.) 1958 (In Spanish) [Santiago].

One hundred twenty-five patients with disseminated lupus erythematosus were observed for at least 8 years in the hospital of the University of Chile in Santiago. Most of the patients were women. One hundred patients were treated with corticosteroids; 25 "controls," who were observed before the advent of corticosteroids, were treated with vitamins, analgesics, and colloidal gold sulfide. The incidence of clinical signs and symptoms, the laboratory findings, and the distribution of predominant lesions were approximately equal in both groups before treatment. Among the controls, 4 patients had 1 or 2 recurrences which lasted between 1 and 3 years. Four of the controls disappeared from observation; in the remaining 21 the disease followed a typical progressive, fulminant course. All these patients died within 2 months to 4 years from appearance of the symptoms (death rate of 100%). The main cause of death was lupus itself.

In the patients treated with corticosteroids, the time between appearance of symptoms and hospitalization varied between a few weeks in the acute cases and a few months in the chronic cases. *Cortisone was given in an initial dosage of from* 200 to 500 mg., followed by maintenance doses of between 6.25 and 12.5 mg. The maintenance therapy was sustained for a period of 1 to 8 years. Prolonged treatment resulted in improvement of the general symptoms, the joint pains, and the cutaneous lesions in 67, 81, and 72% of the cases respectively. All other symptoms of lupus either did not change or became worse. Thirty-three patients discontinued the treatment during an apparent cure or remission of the disease; 9 did not report for observation; 19 had recurrences between 1 month and 6½ years after discontinuation of the treatment; and 5 were still under observation, in an excellent condition, between 5 and 7 years after they had discontinued the treatment. By the end of 8 years, in the whole group of treated patients, 8 had discontinued the treatment, 50 with severe and moderately severe forms of the disease had died, and 42 are living and continuing the treatment. Of the 50 patients who died, survival between initial treatment and death varied between 2 months and 3 years in 22 patients with severe and moderately severe forms of the disease who had early, sufficient, and maintained treatment; it varied between 1 month and 4 years in 28 patients who had either late or insufficient treatment. The cause of death in these treated patients was lupus itself in 36% of the cases and intercurrent diseases in 64%. Forty of the 42 patients who have survived for more than 8 years are ambulant under minimal dosage of corticosteroids and carry on almost normal activity. Only 2 patients are invalids because of lupus. The authors conclude that corticosteroid treatment lowers the death rate from 100% in those not so treated to 54% in those treated. The earlier the start of the treatment, the better the results in prolonging survival with attenuated symptoms.

ANESTHESIA

Fluothane: A New Nonexplosive Volatile Anesthetic Agent: Preliminary Report on 2,000 Administrations. H. M. Ausherman and A. Adan. South. M. J. 52:46-52 (Jan.) 1959 [Birmingham, Ala.].

Fluothane (2-bromo-2-chloro-1, 1, 1-trifluoroethane), a clear volatile liquid which mixes well with oxygen and is not explosive or flammable, was given a trial as the principal anesthetic agent in 2,000 patients, between the ages of 5 weeks and 82 years, who were subjected to almost every type of surgical procedure. There were few poor-risk patients in this group. The length of operation in 66% of the patients was less than 2 hours. The semiclosed technique of administration utilizing the Copper Kettle, one of the most accurate vaporizers, was employed in 1,386 patients. Due to the *ease with which one can administer a lethal con*centration of this agent, the authors believe that a machine with such an accurately calibrated vaporizer is essential to the safe and proper use of this potent agent. The results obtained with this drug suggest that this halogenated ethane is of *more than passing interest in filling the need for a* controlled volatile nonexplosive anesthetic agent. The authors were impressed with the rapid smooth induction, the ease of maintenance with present equipment for anesthetization, the reduction of salivation, the reversibility of the agent's action by controlling the vapor concentration, the adequate muscular relaxation for most surgical procedures, the rapid recovery time without excitement, the reduction in postoperative nausea and vomiting, and the minimal complications.

The commonest complication in administering Fluothane was too deep an anesthesia, especially with the use of the open-drop technique in children. Bradycardia occasionally occurred but usually was relieved by intravenous administration of atropine and by reducing the vapor concentration. Like cyclopropane, Fluothane increases cardiac irritability, and therefore drugs, such as epinephrine, should not be used with this agent. With Fluothane, vagal action on the heart predominates, perhaps explaining the slowing of the pulse, the lowering of the systolic blood pressure more than the diastolic resulting in reduced pulse pressure. The fall in blood pressure appears to be in direct proportion to the concentration of the vapor and especially to the rate at which the concentration is increased. Inhalation of Fluothane produces some degree of respiratory depression, but one of its desirable properties is the ease with which respiration can be controlled and spontaneous respiration be resumed when desired. In using the agent by the open-drop technique or by any method, the anesthetist must be alert and should be experienced. Properly used, it is one of the most useful anesthetic agents to date and deserves further study.

Fluothane: A Modern Substitute for Chloroform. H. R. Griffith, J. G. Robson, W. G. Cullen and D. M. M. Gillies. Anesth. & Analg. 37:316-321 (Nov.-Dec.) 1958 [Cleveland].

The authors' observations in the operating room and in the laboratory and a review of the literature convinced them that halothane (Fluothane) is a potent and versatile drug which may be used by preference in situations which demand a noncombustible controllable anesthetic agent. Halothane is not the harmless, foolproof drug that some of the anethesiologists have dreamed about as an agent to replace all explosive substances. However, it is somewhat less toxic than chloroform. Halothane is no drug for the amateur anesthesiologist. It should be administered in low concentration, with adequate oxygen and preferably some nitrous oxide as a vehicle, and adjustment of the concentration according to the patient's condition must be possible. Proper equipment is necessary for its relatively safe use, together with the most meticulous watchfulness, intelligence, and good judgment on the part of experienced anesthesiologists. Where these prerequisites prevail, halothane may acquire a most useful place in future anesthesiology.

Comparison of Meprobamate, Pentobarbital and Placebo as Preanesthetic Medication for Regional Procedures. E. I. Eger and H. H. Keasling. Anesthesiology 20:1-9 (Jan.-Feb.) 1959 [Philadelphia].

The authors carried out a double-blind comparative study of meprobamate, pentobarbital, and a placebo of lactose in 668 patients, between the ages of 16 and 96 years, who were to undergo surgical treatment in the University Hospitals or the Veterans Administration Hospital in Iowa City, for which a regional anesthetic was to be administered. Of the 668 patients, 199 were aged less than 60 years (young patients), 265 were over 60 years of age (older patients), and 204 were patients having some mild to severe mental impairment due to diseases of advancing age (senile patients). An attempt was made to determine the effect of each of the 3 preparations on the patient's apprehension, cooperation, drowsiness, reaction to painful stimuli, talkativeness, nausea, and emesis. The anesthetist's evaluation of the adequacy of each premedicant was also determined.

Either meprobamate or pentobarbital was more effective than placebo as premedicant in young patients, but this difference tended to become less in the older age group and to disappear in the senile group. In general, meprobamate or pentobarbital prevented an increase in apprehension, as viewed by either patient or anesthetist, this effect being most marked in the young patients, and absent or undiscernible in the senile group, while the older group may represent an intermediate between the other two. Cooperation was affected by meprobamate and pentobarbital in a significant manner only in the young patients in whom a decrease in cooperation was prevented. Sleep was significantly and favorably affected by the preceding administration of either meprobamate or pentobarbital as compared with placebo. Both meprobamate and pentobarbital caused an increase in drowsiness, the latter drug also causing a significantly greater degree than the former. No difference in the reaction to painful stimuli could be detected among the patients receiving either one of the two drugs. Talkativeness, emesis, and nausea were apparently unaffected by the drugs, although, in the case of nausea, increase in dosage was followed by decreased incidence; the effect of increasing the dose of placebo, however, was indistinguishable from the effect achieved by the increased dosage of the other drugs. Over all, the effect of meprobamate and pentobarbital is considered to be a favorable one and is most apparent in the group of young patients. No distinct advantage is seen in the use of one of the drugs as opposed to the other.

BOOK REVIEWS

Drinking and Intoxication: Selected Readings in Social Attitudes and Controls. Edited by Raymond G. McCarthy, Associate Professor, Health Education, Yale University, New Haven, Conn. Cloth. $7.50. Pp. 455, with illustrations. Publications Division: Yale Center of Alcohol Studies, New Haven, Conn.; Free Press, Glencoe, Ill., 1959.

Although this book is a symposium by 59 authors, expressing many viewpoints, the editor has successfully managed to present the problems of drinking, its complications, and possible remedies. After excellent chapters on the physiological and psychological effect of alcohol comes a most interesting discussion of the drinking habits of numerous cultures, from biblical times to the present. The illustrations are particularly well chosen and represent ancient statuary, bas-reliefs, and story-telling tapestries. Other chapters deal with the drinking habits of various ethnic groups, high school students, and college students, and contributory cultural, religious, and ethical factors. The account of the controversy between "wets" and "drys" is informative, and the motivation of the two groups is discussed in a logical manner. The reader will be particularly impressed, favorably or otherwise depending on his psychological background, with the chapter by Myerson, Alcoholism: The Role of Social Ambivalence. Hedonism, the worship and seeking of pleasure, is contrasted with asceticism, which runs counter to desire and satisfaction and when carried to its logical extreme is against reproduction: "Man is born into sin. He becomes a third excretion born between urine and feces." Man's ambivalence concerning sexual matters also applies to the use of alcohol. The author advises a middle course: "Against unwise hedonism, against extravagant asceticism, we need to build a code of temperate hedonism and successful self-control." The book should appeal particularly to the student of history, the sociologist, and the scientist. The worshipper of Bacchus may be persuaded to mend his ways, while the ascetic "dry" may feel that his convictions are not represented with sufficient vigor. Finally, this excellent symposium has succeeded in its purpose of furnishing knowledge, which will probably do more to control the improper use of alcohol than legislation alone.

Tumors of the Lungs and Mediastinum. By B. M. Fried, M.D., F.C.C.P., Associate Attending Physician, Montefiore Hospital, New York. Cloth. $13.50. Pp. 467, with 235 illustrations. Lea & Febiger, Washington Sq., Philadelphia 6, 1958.

This book, although not all-inclusive, presents most of the important data pertaining to tumors of the lungs and mediastinum. Much of this material is controversial, and the author has attempted to present the various theories clearly in an unbiased manner. Most of this study deals with bronchogenic cancer. An attempt was made to study, whenever possible, the incipient stages of this disease. This was done by obtaining records of previous hospital admissions and of private physicians who had treated the patients at an earlier period. This is no mean task. The second section is devoted to a study of tumors and cysts of the mediastinum. The frequency of these conditions is stressed as is the differential diagnosis between primary and metastatic lesions. Chapter 17, which discusses tumors of the thymus gland and thymic cysts, is especially good. The book is well illustrated with roentgenograms, photographs, line drawings, and photomicrographs. Bibliographic references are given at the end of each chapter. This book can be highly recommended.

Chemical Concepts of Psychosis: Proceedings of the Symposium on Chemical Concepts of Psychosis held at the Second International Congress of Psychiatry in Zurich, Switzerland, September 1 to 7, 1957. Edited by Max Rinkel, with Herman C. B. Denber. Cloth. $7.50. Pp. 485, with illustrations. McDowell, Obolensky, Inc., 219 E. 61st St., New York 21; George J. McLeod, Ltd., 73 Bathurst St., Toronto 2B, Canada, 1958.

This book is divided into (1) historical survey; (2) reports of chemical, clinical, and physiological studies on lysergic acid diethylamide (LSD-25), mescaline, epinephrine metabolites, chelation, serotonin, indole, and central and peripheral fluids; (3) neuroleptic patients; (4) genetic, biological, and philosophical considerations of schizophrenia; (5) surveys of theoretical and methodological aspects of the problem; and (6) a general appraisal by Gilbert Cant, the medicine editor of *Time*. It is pointed out that "Any illness, including mental illness, can be discussed in a variety of ways: chemical, biological, pharmacological, sociological, through to psychology, philosophy and religion, not to mention medicine and psychiatry"; that biological and chemical theories concern the present symposium; that current chemical theories chiefly envision endogenous toxic factors resulting either from imbalances of chemical substances normally occurring in the body or from the development of new substances; and that the new chemical approach arose from the observation of the psychotomimetic effects of a variety of drugs, particularly mescaline and LSD-25. An effort has been made to imitate mental disorders by the use of such drugs, to discover variable factors and controls, and so to unmask possible chemical bases for psychotic states. Most of the symposium is

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These book reviews have been prepared by competent authorities but do not represent the opinions of any medical or other organization unless specifically so stated.

devoted to a description of the behavioral effects of the chemical substances mentioned above in experiments on animals, as well as their subjective effects on normal and psychotic human subjects and to the theoretical interpretation of the results.

It is difficult to restrain one's enthusiasm for the chemical attack on the psychoses, as so vividly documented and brought up to date in this book. Weary with age-long discouragements in the therapy of the psychoses the physician eagerly embraces the possibility of a new understanding and a new and hopeful approach. Without question, the chemical concept of psychosis offers the most optimistic prospect in psychiatry today. One's enthusiasm is, however, like that experienced at the birth of a baby—directed to the promise of the future; for the accomplishments so far, while exciting, are only the first steps toward a distant goal. In the present volume much is said about chemical formulas and pharmacological theory, but there are, inevitably, uncertainties and often contradictions in detail, which eventually will be resolved. The fact that schizophrenic states are not convincingly imitated by any drugs used is recognized in this book, but there is scant appreciation that whatever schizophrenia is, it is not a single disease but a congeries of more or less related states. The promising chemical concepts of psychosis here outlined must be adapted to a more precise subdivision of symptomatology before precise formulations of chemical factors in mental illness can be made. Precision is even more necessary in attempts to modify, intensify, or diminish psychotic symptoms by chemical means in experimental work with human patients. Chemists working in this fertile field must be guided and informed by the best clinical skill in this delimitation of psychiatric categories. The medical reader will need to keep clearly in mind that while the so-called psychoses—chiefly schizophrenia and the affective psychoses—appear likely to be metabolic disorders, and so basically chemical, the neuroses are rather acquired ways of life, learned distortions of character, and unlikely to be vulnerable to chemical analysis. This book is highly recommended to every physician as presenting in easily intelligible terms the latest work in a promising field with tremendous implications for the future.

The Middle Ear. By Heinrich G. Kobrak. Contributors: J. E. Fournier and others. Foreword by John R. Lindsay. Cloth. $15. Pp. 254, with illustrations. University of Chicago Press, 5750 Ellis Ave., Chicago 37; Cambridge University Press, Bentley House, 200 Euston Rd., London, N. W. 1, England; University of Toronto Press, Toronto 5, Canada, 1959.

This book is timely, because the middle ear has assumed increasing importance in recent years as new operations have been devised to deal with the problem of hearing loss in both suppurative and nonsuppurative states. Untimely, however, was the sudden death of the author, in 1957, before the completion of this work. He had pioneered in demonstrating the acoustic vibrations of the eardrum and ossicular chain by means of stroboscopic cinematography. His "staging" of these highly successful films revealed him to be a master showman as well as an outstanding educator. Such observations and his knowledge of the subject in general form the basis of his contributions, mainly to the first part, discussing the middle ear in health and disease. Alvar Wilka and J. E. Fournier also contributed to this part. The second part deals with treatment. Dr. John R. Lindsay, who also wrote the foreword, discusses otosclerosis and fenestration; Dr. Samuel Rosen, the mobilization and fenestration of the stapes; Dr. Kobrak, the treatment of middle ear deafness by prosthesis; Dr. Horst Wullstein, tympanoplasty; and Dr. Fritz Zoellner, the plastic surgery of the sound conduction system of the middle ear.

To the extent that modern otology is dedicated to the elimination of conductive deafness this book provides a summary of the past and present knowledge of the subject; but the problems and failures in otosurgery are not sufficiently evaluated for the novice in this field of endeavor. The chapter on stimulus and function is excellent. As is so frequently the case in a work which represents a number of contributors an integrated assessment of each is lacking, but each person's current thought, which in this type of surgery is undergoing such rapid modification that tomorrow it may be outmoded, is coherently presented. The classification of the types of functional repair of middle ear lesions offered by Wullstein is valuable in understanding the problems involved. Zoellner's enthusiasm for the acoustic probe is not shared by all, but his warnings regarding the problems of achieving ideal results in closing the air-bone gap are much appreciated. Not enough emphasis is given to the adequate treatment of lesions before functional considerations. There is an excellent reference list for each chapter. Some of the black and white photographs and color plates leave much to be desired.

Physical Examination of the Surgical Patient. By J. Englebert Dunphy, M.D., F.A.C.S., Professor of Surgery, Harvard Medical School, Boston, and Thomas W. Botsford, M.D., F.A.C.S., Clinical Associate in Surgery, Harvard Medical School. Second edition. Cloth. $8. Pp. 375, with 203 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W. C. 2, England, 1958.

This new edition of a comprehensive volume on the examination of the surgical patient emphasizes what the surgeon may learn by special attention to history-taking and a careful and knowledgeable elicitation of physical signs. The tools employed are the eyes, ears, fingers, and nose. Clear-cut illustrations portray the various conditions discussed in the text, and enough clinical information is given to enable the reader to understand what a physical finding signifies. Every area of the body is covered except the eye, ear, nose, heart, and lungs, the authors believing that these areas are well presented in standard textbooks on physical diagnosis. That the surgeon is not relieved of careful examination in these fields is emphasized, since reliance on medical or other colleagues prevents personally knowing and evaluating all the data.

A perusal of all the information offered reveals a tremendous amount of material available to the reader, whether he be a student or practitioner; and even the teacher would do well to review this book. Several special chapters are particularly informative; these deal with examination of the head and neck, the abdomen of infants and children, the infected hand, the peripheral blood vessels, ulcer and gangrene of the extremities, examination for the detection of cancer, and the general principles and specific examinations of the traumatically injured patient. Such patients are encountered more and more in industry and transportation and are rightfully receiving greater attention.

It is true that laboratory tests and x-ray studies are providing much information about diseases and injuries, but fundamentally the beginning is the physician-patient relationship initiated by listening to what the patient has to say, asking searching questions, and making a careful and thorough examination. This book should be of immeasurable aid in maintaining a high standard of acumen in the time-honored skill of examining the patient.

Rapports présentés au III^{ème} Congrès international d'allergologie, Paris, 1958. (Proceedings presented at the IIIrd International Congress of Allergology.) Edités par B. N. Halpern et A. Holtzer. [In French, English, German and Spanish.] Cloth. 6,000 francs. Pp. 940, with illustrations. Ernest Flammarion, 22 rue du Vaugirard, Paris 6e; Congrès international d'allergologie, 197 boulevard Saint-Germain, Paris, France, 1958.

In recent years the concept of allergy has begun to permeate many fields of medical research and clinical medicine, including infectious diseases, collagen disturbances, and autoimmune manifestations. These trends are reflected in this book. The symposiums presented deal with asthma, emphysema, the properties of allergic antibodies, recent advances in clinical allergology, the biochemical aspects of hypersensitivity (histamine, serotonin, acetylcholine, and slow-reacting substance), and autoimmune and isoimmune reactions (blood, encephalomyelitis, kidney, lupus and other collagen diseases, and homografts), atopic dermatitis, and allergic problems in different parts of the world. The contributors to this volume include Sir Henry Dale, Pasteur Vallery-Radot, Charles Eoeffler, Peter Forsham, Elvin Kabat, Merrill Chase, Pierre Grabar, C. Jimenez-Diaz, Harry Alexander, Murray Peshkin, H. O. Schild, Richard Schayer, Bernard Halpern, W. D. M. Paton, Robert Good, W. J. Harrington, Max Samter, J. Dausset, P. Miescher, Guy Voisin, Marion Sulzberger, W. Jadassohn, R. L. Mayer, Bram Rose, William Sherman, and many others. Each brings his particular subject up to the minute. The result is that the book is an exposition of the status of clinical and experimental allergology more up to date and more detailed than any textbook. More than half of the articles are in English, while those in French, German, or Spanish have complete summaries in English. This volume should be profitable not only to allergists, but also to immunologists, internists, dermatologists, pediatricians, and progressive physicians in general.

Heart Disease in Infancy and Childhood. By John D. Keith, M.D., Assistant Professor of Pediatrics, University of Toronto Faculty of Medicine, Toronto, Richard D. Rowe, M.B., F.R.C.P., Clinical Teacher, Department of Pediatrics, University of Toronto Faculty of Medicine, and Peter Vlad, M.D., Instructor in Pediatrics, Department of Pediatrics, University of Buffalo School of Medicine, Buffalo. Cloth. $22.50. Pp. 877, with illustrations. The Macmillan Company, 60 Fifth Ave., New York 11; Brett-Macmillan Ltd., 25 Hollinger Rd., Toronto 16, Canada, 1958.

Seldom has a more satisfactory book appeared on this subject. It covers its field thoroughly and scientifically. It is voluminous yet both readable and conveniently organized for reference purposes. Its chapters are well arranged. Its writing is not dogmatic, and its bibliography is complete. The diagrams and photographs are instructive and illuminating. It should be in the library of every pediatrician and cardiologist, and should prove a useful reference to the general practitioner. This review is short because there is nothing controversial in the book. No single chapter or subject is selected for criticism or praise because they are all of equally high quality.

Practical Dermatology. By George M. Lewis, M.D., F.A.C.P., Professor of Clinical Medicine (Dermatology), Cornell University Medical College, New York. Second edition. Cloth. $8. Pp. 363, with 121 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W. C. 2, England, 1959.

In the preface to this new edition the author states, "As expressed in the preface to the first edition, this book, designed as a text for medical students, a practical guide for general practitioners, and an aid in orientation for other specialists, was written to meet the often expressed desire of my students to have a concise and well-illustrated text which would still serve their needs after they enter practice. It seeks to describe, as succinctly as possible, the clinical features and the methods of management of the more common skin disorders. Emphasis throughout the text is centered on (a) means to accurate diagnosis and (b) selection of appropriate treatment. To the student and practitioner recognition and identification of skin lesions pres[illegible] the outstanding dermatologic problems, but a chan[illegible] is often difficult and challenging." [illegible] at this tir

All of these objectives have been successfully attained. The author does not claim to have produced an all-inclusive reference work, but the descriptions of the dermatoses are brief and accurate. The limitations of space do not permit controversial discussions of cause and treatment, and some of the author's colleagues may take exception to some of his statements concerning both. The photographs are excellent and are arranged in unusual groupings of four and six to a page with the legends below. The legends were difficult to follow because of lack of differentiation in the typography. This volume is a worthy successor to the first edition and certainly meets the desires of students to have a "concise and well-illustrated text which would still serve their needs after they enter practice." The publishers are to be congratulated on the excellent compositing of this volume.

Growth and Development of Children. By Ernest H. Watson, M.D., Professor, and George H. Lowrey, M.D., Associate Professor, Department of Pediatrics and Communicable Diseases, University of Michigan Medical School, Ann Arbor. Third edition. Cloth. $7.75. Pp. 334, with 75 illustrations. Year Book Publishers, Inc., 200 E. Illinois St., Chicago 11, 1958.

This is the third edition of a text which was last edited in 1954 and reprinted in 1956. Since its original publication in 1952 it has become the "bible" for students and young pediatricians preparing for examinations by the American Board of Pediatrics. This edition retains much of the material of the previous ones, but changes and additions have been made in every chapter except the first. Many charts, tables, and graphs are included for summarizing purposes, but the authors are quick to point out that average figures thus arrived at may not apply to the individual. The entire chapter on the role of the endocrine glands has been rewritten, but unfortunately the publication date did not allow for the inclusion of recent interesting information about masculinization of the female fetus due to the administration of progesterones during gestation. The chapter on heredity and environmental factors is based on the assumption that there are 48 chromosomes in man. A footnote states that recent studies indicate that there are 23 pairs of chromosomes in man rather than 24 pairs as has been taught in the past, but the authors believe that in order to avoid confusion the old concept should be temporarily retained. Statistics in human heredity are still based on the old number of 48 and probably will continue to be for some time. The chapter entitled Behavioral Development has been changed to Behavior and Personality to emphasize the greater interest in the area of personality development. Over 100 new references have been added and it is apparent that a new edition of this excellent text is a worthwhile addition to recent literature on this subject.

Clinical Orthopaedics. Number Twelve: Fall, 1958. Anthony F. DePalma, editor-in-chief. With assistance of associate editors, Board of Advisory Editors, and Board of Corresponding Editors. Cloth. $7.50; $6 to sustaining members. Pp. 327, with illustrations. J. B. Lippincott Company, E. Washington Sq., Philadelphia 5; 4865 Western Ave., Montreal 6, Canada, 1958.

This volume is similar in format to the preceding ones in the series. The first article, historical in nature and dealing with the life of Dr. Buckminster Brown, is interesting, and the series dealing with the lives of early orthopedists is well done. Too many of the younger orthopedists do not realize the importance of the contributions of the pioneers in their field, and these articles are an excellent historical review. The first portion of the book deals primarily with problems of disability evaluations and various rehabilitation programs and in general the scope, techniques, and conclusions are well founded. The fact that rehabilitation is a team effort is emphasized. The second section of the book is devoted to general orthopedics and contains many interesting articles. One is on whiplash injuries of the cervical spine. It is felt the term "whiplash" should be deleted as a diagnostic term and "cervical strain or sprain" be substituted. The last portion of the volume has a very interesting article in which the author correlates the changes in the skeleton of the gorilla with those in that of man. The last article, on the appearance of a sarcoma after a surgically treated fracture of the tibia, is a brief but interesting case report. In this excellent volume the photographs and roentgenograms are of high quality.

Staphylococcal Infections. By Ian Maclean Smith, M.D., Ch.B., F.R.F.P.S.G., Assistant Professor and Chief, Infectious Disease Division, Department of Internal Medicine, State University of Iowa, Iowa City. Paper. $4.25. Pp. 180, with illustrations. Year Book Publishers, Inc., 200 E. Illinois St., Chicago 11, 1958.

This is a brief, practical, working manual dealing primarily with the clinical manifestations of staphylococcic infection. The manner of presentation is simple and categorical. This has obvious advantages to the practitioner and to the reader who wants a gallery of thumbnail sketches of the infections caused by staphylococci, but the critical reader may wonder if matters are really so cut and dried. A brief résumé of the biology of Staphylococcus is followed by chapters on diseases of the skin, respiratory infections, osteomyelitis, the gastrointestinal system and abdomen, septicemia and endocarditis, miscellaneous problems, diseases of animals, and the treatment of staphylococcic diseases. This is a useful volume but it is not to be compared with such a scholarly work, for instance, as "Staphylococcus pyogenes and Its Relation to Disease," by Prof. Stephen D. Elek of London, which has simultaneously become available through the Williams and Wilkins Company of Baltimore.

QUESTIONS AND ANSWERS

PUBLIC WATER SUPPLY

To the Editor:—*Please comment on a community water supply on which the following report was made: actual hardness, 2.4 grains per gallon; compensated hardness (computed from actual hardness, iron content, and sodium content), 6.0 grains per gallon; iron, 1.8 ppm; sodium salts, 1.1 ppm; alkalinity, 2.8 (expressed in grains per gallon of $CaCo_3$); and suspended solids or turbidity, none. The acidity in the sample was caused by the presence of free carbon dioxide. It was estimated that the water sample as received contained about 100 ppm of free carbon dioxide. For an accurate determination of the carbon dioxide content, it is necessary to follow a special sampling procedure and to analyze for the carbon dioxide at the job site.*

R. F. DeWitt, M.D., Plymouth, N. H.

Answer.—The analysis indicates that the water corresponds in general to that from wells in the New England area. In hardness it is high for a soft water, and this is the case also for sodium salts and for alkalinity. The high iron content is undoubtedly of more significance than the hardness from the standpoint of the household or industrial use of the water. If troubles from the presence of iron in public water supplies are to be avoided, it is generally recommended that the iron content be no higher than 0.3 ppm. The iron in ground waters is due to the presence of this element in the earth's crust. The iron dissolves in ground water particularly when there is an excess of carbon dioxide and an absence of oxygen in the underground source. When a well taps this strata, the water, when first drawn, may be clear and colorless. After being in contact with the air, however, it loses its excess of carbon dioxide and the iron then tends to precipitate and form a brownish turbidity. When this water is used, the iron will collect as rusty stains on plumbing fixtures, glassware, laundry, and other articles with which it comes in contact. For this same reason the water is unsuitable for a number of industrial uses, including paper making, laundering, and dyeing. From the standpoint of human health, the water is not likely to be dangerous. When treatment plants are available for public water supplies, any excess iron can be removed by aeration, the use of coagulants, and filtration. Removal of minerals from water by ion exchange resins is also possible.

POSSIBLE TUBERCULOSIS WITH LEUKEMIA

To the Editor:—*A 78-year-old man has had chronic lymphatic leukemia for years. His leukocyte count is now 30,000, with 60 to 70% lymphocytes. Two years ago nodules appeared in his neck and subsequently in his elbows and groin. The nodules were diagnosed by the pathologist as being malignant lymphosarcoma. These have responded well to x-ray therapy, the amount of irradiation required being small. Roentgenograms of the chest were consistently negative until in May, 1958, when a mass was noted in the right lung. A pathological fracture developed in the right clavicle. With the increasing spread of the lesion, a small dose of x-ray therapy was given to the right lung, producing a severe physical reaction. Sputum examined subsequently was said to contain tubercle bacilli on slide, culture, and animal inoculation. Bronchoscopy, four months later, gave the impression that the lesion was not tuberculous but neoplastic and not necessarily related to the leukemia. Sputum examinations, after the patient had been taking PAS and isoniazid, were reported by different laboratories as negative, as containing photochromogens, and as being positive for tubercle bacilli. Animal inoculation is now in progress. Should this patient be given a course of nitrogen mustard? There has been a weight gain of about a pound a week. Anemia (hemoglobin 8 Gm. per 100 ml.) has been corrected through cell mass transfusion. Physically, the patient appears well and is without fever or cough. Roentgenograms taken in August and December showed some extension of the mass. Should this patient be isolated, and what treatment is recommended?*

Virginia Downes, M.D., Milwaukee.

Answer.—It is not unusual for lymphocytic leukemia to pursue a benign course in persons beyond 65. The appearance of cervical, epitrochlear, and inguinal adenopathy is more probably related to the leukemia than to malignant lymphosarcoma, but it is difficult to differentiate histopathologically between these conditions. The good response to small doses of x-ray without subsequent reappearance of other nodes gives further support to this point. It was not stated whether there was a change in the hemoglobin or platelet level at this time.

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any medical or other organization unless specifically so stated in the reply. Anonymous communications cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

man has had long-standing vesical neck obstruction in which time his sphincters have become impaired. This often will cause a patient to dribble. This consultant, therefore, recommends increasing the daily fluid intake to 3,000 cc., exercising the sphincter at the time of voiding, the use of proper therapy depending on bacterial sensitivity, and patience.

AUGMENTATION MASTOPLASTY

To the Editor:—*What is the current status of the use of plastic inserts to supplement meager breasts? Please comment on safety; percentage of good immediate and long-term results; consequences of failure; and preferred type of procedure.* *C. O. Murray, M.D., Crockett, Texas.*

Answer.—Augmentation mastoplasty as currently performed has not been accepted as a good procedure by most plastic surgeons. Theoretically, small breasts need bulk to fill them out. To do this, one should use some type of autogenous graft. A free fat graft from the buttocks should be the material of choice, but unfortunately fat transplants do not survive well. Some surgeons have buried plastic sponges beneath small breasts. While this material is relatively inert, it is still a foreign body. It produces some inflammatory foreign body reaction which makes the breasts become stony hard. In others, the reaction is so great that the material has to be removed. The surgical treatment of this complication may be difficult because of the fibrous tissue reaction that has developed. While no cases in human beings have been reported, it is known that these plastic materials can produce carcinoma in experimental animals.

PAROSMIA

To the Editor:—*A 17-year-old woman has always had a keen sense of smell. In the last two to three years odors have bothered her. In the past year a cafeteria was installed in the high school she attends, and the smell of cooking foods has nauseated her. This has become so severe recently that the smell of some foods has caused headache and severe nausea. She had marked tenderness over the duodenum. She was placed on an ulcer diet and the abdominal soreness improved. The smells have continued to nauseate her. The only other pertinent factors include hay fever and moderate nervousness. Can you suggest any further treatment?*

R. S. Srigley, M.D., Altus, Okla.

Answer.—Parosmia, or perverted sense of smell, it is organic, is always cortical in origin. Thus, lesions of the uncinate gyrus or disease of the tip of the temporal lobe might produce a disagreeable olfactory sensation. These may be associated with seizures or constitute a seizure in the areas described previously. With this in mind, an electroencephalogram might be helpful in diagnosis. If the tracing demonstrates dysrhythmia in one or the other or both temporal lobes, investigation of the type of lesion would be important. If there is no tumor or other organic focal disorder, one would expect good results with anticonvulsant therapy. The physician should also be on the lookout for local nasal conditions such as empyema of the maxillary sinus and ozena from chronic atrophic rhinitis. These conditions should suggest consultation with a rhinologist. When the possibility of organic disease is ruled out, it is suggested that this patient might have hysterical parosmia. A careful psychiatric history should be of value. In hysteria, the whole function of the nose (as comprehended by the patient) is lost. If the situation is of psychic origin the answer is psychotherapy. It is difficult to see the connection between the duodenal tenderness and the parosmia.

PHOSPHATASE LEVELS

To the Editor:—*In a patient having 9.2 King-Armstrong units of acid phosphatase and 72 King-Armstrong units of alkaline phosphatase, is such an acid phosphatase level of any importance?*

Joseph Burns, M.D., Miami Beach, Fla.

Answer.—The exact interpretation of this rise in acid phosphatase level associated with a substantial elevation in alkaline phosphatase level is not possible without more clinical information, but the general principles underlying the interpretation of such results are outlined below. The determination of serum acid phosphatase level, that is, the phosphatase activity at pH 4.9, represents the activity of a distinct enzyme and not the residual activity at this pH of the alkaline phosphatase. In other words, it is possible to have alkaline phosphatase levels 40 to 50 times the normal value without having any increase in the acid phosphatase level.

The serum acid phosphatase determination performed with beta-glycerophosphate as the substrate rarely shows elevations in conditions other than carcinoma of the prostate. Such conditions as fecal impaction or prostatic massage may cause slight transitory elevations, but the King-Armstrong method in which phenylphosphate is used as substrate shows slight or moderate elevations in patients who do not have carcinoma of the prostate. Such elevations have been reported in patients with familial splenic anemia, metastatic carcinoma of the breast in women, Paget's disease, and various inflammatory diseases. In the patient mentioned, the elevated alkaline phosphatase level is undoubtedly due to an osteoblastic lesion or to an obstructive process in the liver. The moderate elevation in acid phosphatase level (performed by the King-Armstrong method) may be due to any of the conditions listed above.

IRRITABILITY OF MYONEURAL JUNCTION

To the Editor:—*Recently, several patients have shown evidence of either increased irritability of the myoneural junction or primary muscle fiber hypertonicity in conjunction with such chronic states as sprains, myositis, poliomyelitis, or virus encephalomyelitis (Guillain-Barré syndrome). These patients, after such exertion as playing in a gym class, walking a little more than average, or using the previously involved muscles in physical activity, have what may be termed a "charley horse." What causes this condition? Quinine has been given in doses of 0.3 Gm. and has been successful in some but not in others. What is the best treatment?*

Earl F. Hoerner, M.D., Orange, N. J.

Answer.—No evidence exists in favor of increased irritability of the myoneural junction or of the muscle fibers in any of the conditions named. While the possibility of facilitation of reflex spasm of muscles exists in poliomyelitis and in virus encephalomyelitis by reason of involvement of internuncial neurons, this neurological explanation not only is speculative and not applicable to the other conditions mentioned but also is not of interest to the questioner. No muscular lesion is common to the group of conditions listed, but where muscle weakness is evident sprains occur much more easily. Similarly, when repair processes are incomplete after sprains or myositis, overactivity or trauma may easily lead to additional soft tissue injury and inflammation because of the susceptibility of the delicate vessels and fibers of the repair tissue. If this explanation is correct, proper support and a graduated program of activity would be indicated, and, empirically, this is successful. It is doubtful whether any drug would have any appreciable influence on this process. The trial of medicaments used to treat diseases involving overactivity of the myoneural junction, myotoma congenita, dystrophic myotonia, and paramyotonia probably would not be indicated.

BANKED BLOOD

To the Editor:—*May jaundice be caused by banked blood that has been processed for over 14 days? What is the maximum time processed blood may be stored before use for transfusion?*

Joseph T. Phillips Jr., M.D., Norton, Va.

Answer.—Whole blood drawn under recommended conditions into acid-citrate-dextrose solution and properly stored is clinically useful for 21 days after venesection. Deterioration of stored blood does occur, however. Such deterioration is minimal for the first 10 days of storage and then increases steadily. Deterioration is judged by the survival of erythrocytes after infusion into the recipient. Blood stored for 21 days has a 70% survival rate, i. e., 70% of the infused erythrocytes exhibit normal persistence in the recipient, while 30% are removed from his vascular system within 24 hours after infusion. It is these nonviable erythrocytes that provide hemoglobin and eventually bilirubin and, in some cases, jaundice. Such jaundice appears and disappears within 24 hours of infusion. The 21-day limit for bank blood storage is based on clinical study and experience as being tolerable.

Release of 20 Gm. of hemoglobin via nonviable erythrocytes is associated with an increase of 1 mg. per 100 ml. in serum bilirubin levels. Mollison estimated that 75 Gm. of hemoglobin would have to be released in vivo within an hour or two to produce clinical jaundice. The quantity of blood being infused and the basic health of the recipient must also be considered. The use of almost outdated donor blood should be avoided if possible, particularly in large amounts, in transfusing patients with known liver deficiencies. Such situations seldom arise, because most blood banks try to balance supply with demand so that blood will be used long before the expiration date.

OBESITY IN YOUNG BOY

To the Editor:—*A 12-year-old boy has sex infantilism with obesity (adiposogenital dystrophy). He has been given weekly injections of chorionic gonadotropin and 30 mg. of thyroid extract daily. He has continued to gain weight despite a rather limited diet, and the genitalia are still immature and show no evidence of normal growth. He has recently been given 5 mg. of methyltestosterone twice daily. What further treatment is recommended?* *C. W. May, M.D., Tacoma, Wash.*

Answer.—With the patient only 12 years of age, one would be skeptical of the diagnosis of adiposogenital dystrophy in the absence of clinical and/or laboratory evidence of an intracranial tumor, cyst, or injury or previous encephalitis. His obesity may have no relationship to this syndrome but may be exogenous due to excessive eating; furthermore, the small genitalia may be relative, due to an abundance of fat in the pubic region. Small genitalia before puberty may be physiological. If treatment is indicated, chorionic gonadotropin may be given in doses of 1,000 I.U. three times weekly for six weeks, followed by 5 mg. of methyltestosterone twice daily for six weeks, with these drugs alternated for several months according to the clinical response. In addition, the calorie intake should be controlled by a diet with 1,000 to 1,250 calories daily. It may be necessary to evaluate emotional factors and correct these if possible. If weight cannot be reduced by diet alone, an appetite depressant may be needed, such as 10 to 15 mg. of prolonged-action dextro amphetamine sulfate given once daily after breakfast. Unless this boy has evidence of hypometabolism, there is no indication for the administration of dessicated thyroid. Failure of response to this regimen by the time puberty should appear (13 to 14 years of age) warrants a thorough endocrinological investigation.

RECURRENT CARBUNCLES

To the Editor:—*A 35-year-old woman has had six separate episodes of skin infection, usually large carbuncles, during a nine-month period. Each lesion was located in a different part of the body, usually above her eyes or on her arms. Culture on one occasion revealed Staphylococcus pyogenes var. aureus, which responded each time to erythromycin. All lesions required incision and drainage but cleared with the usual treatment and without complications. The patient's brother has diabetes but her own urine was negative for sugar on numerous tests. Use of hexachlorophene soap has been tried for short periods but not continuously. What would be the best prophylaxis against further skin infections?*

M.D., Utah.

Answer.—In such cases long continued prophylactic measures are required. This means a constant effort should be made to maintain a state approaching surgical cleanliness of the entire skin surface. There should be a brief bath every night with hexachlorophene soap. After this the skin should be dried, and then 70% ethyl or isopropyl alcohol should be applied to the entire body surface. For maximum protection, the alcohol may be applied night and morning. If this leaves the skin too dry, a bland oil may be applied afterward. The patient must be cautioned against fingering or picking at the skin, because infection is often conveyed in this manner. The towels, underwear, nightwear, and bed-linen should be boiled whenever they are laundered. An autogenous vaccine might be helpful, but one should not place too much reliance on this. In view of the family history, an occasional blood sugar estimation would seem advisable. For the treatment of active lesions, the erythromycin would appear to be satisfactory.

PAINFUL LAVAGE OF EXTERNAL AUDITORY CANAL

To the Editor:—*Why do some patients experience severe pain with lavage of the external auditory canal?*

Clinton F. Carrougher, M.D., Brooklyn, N. Y.

Answer.—It is assumed that the pain referred to was associated with attempts to remove impacted cerumen. This may occur because the skin of the external auditory canal is extremely sensitive to pain, and, in some instances, impacted cerumen is hard and almost calcareous in composition so that, when it begins to move out of the external auditory canal with lavage, it acts as an abrasive on this sensitive area. Again, if the wax is hard and lies beyond the isthmus of the external auditory canal, its passage through the isthmus may produce a great deal of pressure against the skin in the isthmus and cause pain.

PERSISTENT PYURIA

To the Editor:—*A patient with a chronic urinary infection has been unresponsive to treatment with sulfisoxazole, nitrofurantoin, and chloramphenicol on separate occasions. Culture of the urine showed a gram-negative rod, probably a Proteus, although the exact organism was not identified. Sensitivity studies revealed resistance to all antibiotics tested. The patient is asymptomatic, but the urine shows a marked pyuria. What treatment should be given?*

A. F. Stratton Jr., M.D., Cocoa, Fla.

Answer.—Since the organism in this infection has not been identified, it would be difficult to suggest what antibacterial agent might be most effective. If sensitivity studies did not include kanamycin, this drug should be considered and sensitivity tests made. It is effective against some types of Proteus, all other gram-negative bacilli except Pseudomonas, and all common coccic bacteria except enterococci. Kanamycin is administered, preferably, in a dosage of 0.5 Gm. intramuscularly every 12 hours for six days, although many infections will respond to 1 Gm. given intramuscularly every 24 hours for six days.

MEASUREMENT OF REACTION TIME

To the Editor:—*What are the most practical clinical methods and equipment for the measurement of reaction time, where job safety demands average or above average general alertness? Does the measurement of the reaction time of the ankle jerk have any special validity for this purpose?*

Philip A. Fuqua, M.D., Richland, Wash.

Answer.—The ankle jerk reflex time would have no value as a measure of a person's ability to respond in complex job situations. In the latter motivation, attention and accuracy of judgment are more important than simple measurements of the time required for nerve impulses to travel to and from the spinal cord. A simple visual motor reaction time measurement is described by Schwab (*Neurology* 8:719, 1958). More complex reaction time tests requiring discrimination between signals may be of more value. The advice of a psychologist trained in these methods may be of value in devising tests applicable to the job situation at hand.

WASHINGTON NEWS

Lawmakers Boost Medical Research Funds . .

A.M.A. Backs Voluntary Health Plan for U. S. Workers . .

Radiation Danger Levels Changed . .

Physician Increase Predicted . .

Government Files Suit Versus Vitamin Company . .

Warning Issued on Lens Cleanser . .

Miscellany . .

HOUSE APPROVES RESEARCH MONEY BOOST

The House ignored administration economy warnings and voted a large increase in funds for medical research. Acting on an appropriations measure carrying money for the Labor Department and the Department of Health, Education, and Welfare, the lawmakers okayed a boost of more than 50 million dollars for research programs of the National Institutes of Health.

All told, NIH would receive $344,279,000 under the House bill, compared with the $292,700,000 requested. The extra 50 million dollars was distributed about equally among the institutes concerned with cancer, mental health, heart disease, dental health, arthritis and metabolic diseases, allergies, neurology and blindness, and general research.

The House Appropriations Committee, which handled the legislation, criticized the administration for not seeking more money for the programs. In a report, the majority of the committee said those who prepared the budget "obviously had been assigned the task of making it appear that the budget represented progress in the field of medical research when the true facts are that in a desperate attempt to present, on paper, a balanced budget, the Bureau of the Budget, or someone in authority, had even gone so far as to set back the medical research program."

Although the administration requested the same sum for NIH that Congress approved last year, the lawmakers contended that rising operating costs would mean a restricted program this year.

The committee said that there is so much hope for medical research progress that this is no time to curtail the programs. Any reduction at this time for the cancer program, it said, "would be a gross foolishness."

Other sections of the measure approved by the House and sent to the Senate would (1) provide $143,700,000 for hospital construction grants, a boost of $42,500,000; (2) appropriate 30 million dollars for construction grants for state and local health research facilities, 10 million dollars more than requested; and (3) earmark $45,500,000 for Indian health facilities, more than 2 million dollars above the budget figure.

Replying to the congressional criticism, Arthur S. Flemming, Secretary of Health, Education, and Welfare, declared that "every statement and figure presented to the committee was presented in good faith." The report, he said, "seeks to convey to the American public the impression that this administration is unwilling to request adequate support for the activities of the National Institutes of Health. . . . This impression is clearly misleading."

A. M. A. STATES POSITION ON HEALTH INSURANCE FOR FEDERAL WORKERS

The American Medical Association told Congress that any voluntary health and medical insurance program for federal workers should steer clear of establishing medical fees and should cover already-retired [illegible]

In a [illegible] Olin Johnston (D., S. C.) of the Senate Labor and Public Welfare Committee, Dr. F. J. L. Blasingame, A. M. A. Executive Vice-president, renewed the organization's support for the principle of an insurance program for civilian government workers similar to those now used by many private companies.

A Labor and Public Welfare subcommittee headed by Sen. Richard Neuberger (D., Ore.) has wound up hearings on the issue and is considering what kind of legislation to approve.

Some changes in the major measure before the subcommittee—a bill introduced by Sen. Johnston—were suggested by the A. M. A. official. "It is our belief that satisfactory amendments could be made rather easily within the framework of this legislation," he declared.

Five broad recommendations were made by the A. M. A. They were that the program should permit a realistic choice of plan by the individual employe; permit all qualified carriers to offer coverage; require financial participation by the employe in paying premiums; provide for a minimum of governmental regulatory authority over participating plans; and allow adequate prefunding for persons who retire after July 1, 1959, as well as a method by which those who retired before that date can participate on a contributory basis.

In addition, said Dr. Blasingame, "it is our definite recommendation that fee schedules not be established by the (Civil Service) Commission." He noted that it was not clear from the language of the measure whether this would be possible. Instead, he said, there should be authorization under the major medical program for payment of a stipulated percentage of the "usual and customary" charges, as most private policies specify.

"The most objectionable features of the bill," said Dr. Blasingame vest authority in the CSC to select "one or more insuring companies" to provide group major medical coverage, and the assumption by the government of the entire cost of this insurance. The A. M. A. official also said language should be changed to make it clear that Blue Cross and Blue Shield could underwrite major medical coverage.

COMMITTEE REVISES RADIATION DANGER LIMITS

A Committee of radiation experts downgraded the radioactive peril of strontium-90 but at the same time calculated that another radioactive byproduct of nuclear tests—cesium-137—is more dangerous than hitherto believed.

According to the National Committee on Radiation Protection and Measurements, civilians may consume through food and drink as much as 100 micromicrocuries of strontium-90 over a lifetime without exceeding maximum permissible concentrations. The previous level was 80 micromicrocuries.

However, the experts slashed by two-thirds the amount of cesium-137 that could accumulate safely in the bodies of workers at atomic installations.

Strontium-90 is the element that in large quantities can cause leukemia and bone cancer. Cesium-137 can cause genetic damage. The levels of both in the atmosphere and in food and drink have been subjects of controversy over whether nuclear tests are depositing too much radioactive matter.

The Committee on Radiation Protection is composed of government and private scientists. Its danger levels are used as guidelines by the government.

At present, the Public Health Service is conducting nationwide tests of milk to determine the amount of strontium-90 in the fluid. So far, the levels have remained well below maximum permissible concentrations. However, Dr. Francis J. Weber, Chief of the PHS Division of Radiological Health, told a House Appropriations Subcommittee recently that there is a rising trend in the radioactive content of milk. He said this will continue until 1970 or 1975 and that the level may reach the maximum permissible concentration. "When that might occur, we do not know," he said.

MEDICAL SCHOOL ENROLLMENT SEEN INCREASING

The long-term increase in medical students will be much greater than the increase in the population, the Executive Vice-president of the American Medical Association said in a letter placed in the Congressional Record.

The A. M. A. official, Dr. F. J. L. Blasingame, said, "The future, I believe, looks bright. Each year for the past 11 years, the number of students enrolled in approved medical schools has increased."

The statements were made in a letter to Rep. Clark W. Thompson (D., Tex.), who had asked for information on "the prospects for an adequate supply of physicians to meet the needs of our growing population."

Dr. Blasingame said that enrollments in medical schools are strictly determined by the individual school, not by the A. M. A. He also declared the medical profession "welcomes one-time federal grants for medical school construction and renovation as well as federal grants for basic research." But Dr. Blasingame said that "the profession has been opposed to continuing federal aid for operating expenses because of the potentialities therein for federal control."

FDA ACCUSES CALIFORNIA VITAMIN FIRM

The Food and Drug Administration has filed criminal charges against a California laboratory for making allegedly false claims about vitamin capsules and mineral tablets. The firm, Visan Nutritional Laboratories, Burbank, was accused of violating the Federal Food, Drug and Cosmetic Act in papers filed with the U. S. District Court in Los Angeles.

According to the FDA, the company falsely claimed that its product—Vi-San Food Supplement Therapeutic—was an effective treatment for a wide range of health problems and diseases, including lusterless eyes, cancer, deafness, blindness, emotional instability, and cerebral palsy.

Maximum penalty for each count of violating the act by a company is a $1,000 fine. Five charges were leveled against the company by FDA, but no individuals were named.

DANGEROUS CONTACT LENS CLEANER

The Food and Drug Administration has warned persons who wear contact eyeglasses to avoid using a product called Barnes-Hind Wetting Solution; the cleanser is distributed across the United States and is sold to practitioners who prescribe contact lenses.

FDA said the product is nonsterile and that a dangerous infection may occur in the eye if any injury or infection is present. A bacterium, Pseudomonas aeruginosa, that was isolated in one lot can cause blindness. The manufacturer, Barnes-Hind Ophthalmic Products, Inc., Sunnyvale, Calif., and the government are attempting to recall all outstanding stocks.

MISCELLANY

The Senate voted to extend the federal Air Pollution Control Program until 1964. The measure also would increase the authorization for the program from 5 million dollars to $7,500,000 a year. Under the program, the government provides grants for studies and research in the field of air pollution.

The Public Health Service awarded a $2,900,000 contract for construction of a 200-bed PHS hospital at Gallup, N. Mex. It will be the largest Indian hospital in the country.

The National Institutes of Health awarded 18 grants totaling $498,790 to support the training of research scientists in eight basic medical and health related sciences. The money will go to 18 institutions and universities in 10 states to provide support for training in the following fields: biochemistry, research anesthesiology, research dermatology, genetics, pharmacology, experimental pathology, physiology, and anatomy.

The Veterans Administration reported that an oral dental examination in the physical check given patients entering hospitals has proved valuable in diagnosing cancer. Since oral examination was adopted generally by the VA two and a half years ago, some 700 cases of malignancy of the mouth, tongue, and throat have been found that might otherwise have been unidentified until too late for successful treatment.

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SEARLE

MEETINGS

AMERICAN MEDICAL ASSOCIATION: Dr. F. J. L. Blasingame, 535 North Dearborn St., Chicago 10, Executive Vice President.
1959 Annual Meeting, Atlantic City, June 8-12.
1959 Clinical Meeting, Dallas, Texas, Dec. 1-4.
1960 Annual Meeting, Miami Beach, Fla., June 13-17.
1960 Clinical Meeting, Washington, D. C., Nov. 29-Dec. 2.
1961 Annual Meeting, New York City, June 26-30.
1961 Clinical Meeting, Denver, Nov. 28-Dec. 1.

AMERICAN

1959

May

American Association for the History of Medicine, Wade Park Manor, Cleveland, May 21-23. Dr. John B. Blake, Smithsonian Institution, Washington 25, D. C., Secretary.

American Association on Mental Deficiency, Hotel Schroeder, Milwaukee, May 19-23. Dr. Neil A. Dayton, Mansfield State Training School & Hospital, Mansfield Depot, Conn., Secretary-Treasurer.

American College of Cardiology, Benjamin Franklin Hotel, Philadelphia, May 26-29. Dr. Philip Reichert, 480 Park Ave., New York 22, Secretary.

American College Health Association, Warwick Hotel, Philadelphia, May 6-9. Dr. Bruce S. Roxby, Temple University Health Service, Broad St. & Montgomery Ave., Philadelphia 22, Chairman, Committee on Local Arrangements.

American Gynecological Society, The Homestead, Hot Springs, Va., May 21-23. Dr. Andrew A. Marchetti, 3800 Reservoir Rd., N. W., Washington 7, D. C., Secretary.

American Ophthalmological Society, The Homestead, Hot Springs, Va., May 28-30. Dr. Maynard C. Wheeler, 30 West 59th St., New York 19, Secretary.

American Society of Maxillofacial Surgeons, Palmer House, Chicago, May 10-14. Dr. Orion H. Stuteville, 700 N. Michigan, Chicago 11, Secretary.

American Trudeau Society, Palmer House, Chicago, May 25-27. Dr. E. P. K. Fenger, 1790 Broadway, New York 19, Secretary.

American Urological Association, Western Section, Monterey, Calif., May 17-21. Dr. James Ownby Jr., 516 Sutter St., San Francisco, Registration Chairman.

Georgia, Medical Association of, Bon Air Hotel, Augusta, May 17-20. Mr. Milton D. Kreuger, 875 W. Peachtree St., N. W., Atlanta, Executive Secretary.

Illinois State Medical Society, Hotel Sherman, Chicago, May 19-22. Dr. Harold M. Camp, 224 S. Main St., Monmouth, Secretary.

International College of Surgeons, Alabama Surgical Section, Erskine Hotel, Huntsville, May 21-22. Dr. E. V. Caldwell, 2515 Memorial Pkwy., S. E., Huntsville, Ala., General Chairman.

International College of Surgeons, New York State Section, Concord Hotel, Kiamesha Lake, May 28-31. Dr. Milton S. Weinberg, 3741 75th St., Jackson Heights, N. Y., Chairman, Arrangements Committee.

Massachusetts Medical Society, Hotel Statler, Boston, May 19-21. Dr. Robert W. Buck, 22 The Fenway, Boston 15, Secretary.

Minnesota State Medical Association, Hotel Duluth, Duluth, May 25-27. Mr. R. R. Rosell, 496 Lowry Medical Arts Bldg., St. Paul 2, Minn., Executive Secretary.

Mississippi State Medical Association, Hotel Buena Vista, Biloxi, May 12-14. Mr. Rowland B. Kennedy, 735 Riverside Dr., Jackson, Executive Secretary.

National Conference on World Health (Second), Statler Hotel, Washington, D. C., May 7-9. Mr. Philip E. Nelbach, National Citizens Committee for WHO, 1790 Broadway, New York 19, Executive Secretary.

National Tuberculosis Association, Palmer House, Chicago, May 24-29. Mrs. Wallace B. White, 1790 Broadway, New York 19, Secretary.

Nevada Academy of General Practice, Hotel Riverside, Reno, May 21-23. For information write Dr. Roy M. Peters, 495 S. Arlington Ave., Reno, Nev.

New York, Medical Society of the State of, Hotel Statler, Buffalo, May 9-15. Dr. Walter P. Anderton, 386 Fourth Ave., New York 16, Secretary.

Ogden Surgical Society, Ogden, Utah, May 20-22. Dr. O. E. Grua, 412 First Security Bldg., Ogden, Utah, Secretary.

Ohio Valley Proctologic Society, French Lick, Ind., May 14. Dr. Gerson Carmel, 214 Doctors Bldg., Cincinnati 2, Secretary.

Pacific Northwest Society of Pathologists, Olympic Hotel, Seattle, May 14-16. Dr. Nelson R. Niles, University of Oregon Medical School, Portland 1, Ore., Secretary-Treasurer.

Rhode Island Medical Society, Providence, May 12-13. Mr. John E. Farrell, 106 Francis St., Providence 3, Executive Secretary.

Society of American Bacteriologists, Sheraton Jefferson Hotel, St. Louis, May 10-15. Dr. E. M. Foster, University of Wisconsin, Madison 6, Wis., Secretary.

Society for Pediatric Research, The Inn, Buck Hill Falls, Pa., May 8-9. Dr. Clark D. West, Children's Hosp., Cincinnati 29, Secretary.

South Carolina Medical Association, Columbia Hotel, Columbia, May 12-14. Mr. M. L. Meadors, 309 W. Evans St., Florence, Executive Secretary.

June

American Academy of Tuberculosis Physicians, Atlantic City, N. J., June 6. Dr. Oscar S. Levin, P. O. Box 7011, Denver 6, Secretary.

American College of Angiology, World Conference on Angiology, Marlborough Blenheim Hotel, Atlantic City, N. J., June 5-7. Dr. Alfred Halpern, 11 Hampton Court, Great Neck, N. Y., Executive Secretary.

American College of Chest Physicians, Atlantic City, N. J., June 3-7. Mr. Murray Kornfeld, 112 E. Chestnut St., Chicago 11, Executive Director.

American Dermatological Association, Claridge Hotel, Atlantic City, N. J., June 1-4. Dr. Wiley M. Sams, 25 Southeast 2d Ave., Miami, Fla., *Secretary.*

American Diabetes Association, Chalfonte-Haddon Hall, Atlantic City, N. J., June 6-7. Dr. E. Paul Sheridan, 1 East 45th St., New York 17, Secretary.

American Electroencephalographic Society, Claridge Hotel, Atlantic *City, N. J., June 11-14. Dr. Jerome K. Merlis, University* Hospital, Baltimore 1, Secretary.

American Gastroenterological Association, Claridge Hotel, Atlantic City, N. J., June 5-6. Dr. Franz J. Ingelfinger, 69 E. Newton St., Boston 18, Secretary.

American Gastroscopic Society, Atlantic City, June 7. Dr. Arthur M. Olsen, 200 First St., S. W., Rochester, Minn., Secretary-Treasurer.

American Geriatrics Society, Hotel Traymore, Atlantic City, N. J., June 4-5. Dr. Richard J. Kraemer, 2907 Post Rd., Warwick, R. I., Secretary.

American Medical Association, Traymore Hotel, Atlantic City, N. J., June 8-12. Dr. F. J. L. Blasingame, 535 N. Dearborn St., Chicago 10, Executive Vice-President.

American Medical Women's Association, Sheraton Ritz Carlton Hotel, Atlantic City, N. J., June 4-7. Miss Lillian T. Majally, 1790 Broadway, New York 19, Executive Secretary.

American Neurological Association, Claridge Hotel, Atlantic City, N. J., June 15-17. Dr. Charles Rupp, 133 S. 36th St., Philadelphia 4, Secretary.

American Orthopedic Association, *Lake Placid Club, Lake Placid,* N. Y., June 16-18. Dr. Lee Ramsey Straub, 535 E. 70th St., New York 21, Secretary.

American Physical Therapy Association, Hotel Leamington, Minneapolis, June 21-26. Miss Annetta Cornell Wood, 1790 Broadway, New York 19, Executive Director.

American Proctologic Society, Shelburne Hotel, Atlantic City, N. J., June 15-18. Dr. Norman D. Nigro, 10 Peterboro St., Detroit 1, Secretary.

American Rheumatism Association, Mayflower Hotel, Washington, D. C., June 2-6. Dr. Edward F. Hartung, 580 Park Ave., New York 21, Secretary.

American Therapeutic Society, Shelburne Hotel, Atlantic City, N. J., June 4-7. Dr. Oscar B. Hunter Jr., 915-19th St., N. W., Washington 6, D. C., Secretary.

Association for Research in Ophthalmology, Inc., Atlantic City, N. J., June 8-12. Dr. Lorand V. Johnson, 10515 Carnegie Ave., Cleveland 6, Secretary-Treasurer.

Catholic Hospital Association of the United States and Canada, St. Louis, June 1-4. Mr. M. R. Kneifl, 1438 S. Grand Blvd., St. Louis 4, Executive Secretary.

Gastroenterology Research Group, Claridge Hotel, Atlantic City, N. J., June 4. For information write Dr. Charles F. Code, Mayo Clinic, Rochester, Minn.

Idaho State Medical Association, Sun Valley, June 14-17. Mr. Armand L. Bird, 364 Sonna Bldg., Boise, Executive Secretary.

Intermountain Pediatric Society, Sun Valley, Idaho, June 26-28. Dr. J. R. Newton, Memorial Medical Center, 2000 S. 9th E., Salt Lake City, Utah, Publicity Chairman.

International Cardiovascular Society, North American Chapter, Hotel Shelburne, Atlantic City, N. J., June 6. Dr. Paul T. DeCamp, 3503 Prytania St., New Orleans, Secretary.

Maine Medical Association, The Samoset, Rockland, June 21-23. Dr. Daniel F. Hanley, P. O. Box 240, Brunswick, Executive Director.

Medical Library Association, King Edward-Sheraton Hotel, Toronto, Can., June 15-19. Miss Nettie A. Mehne, The Upjohn Co., Kalamazoo, Mich., Secretary.

Society for Investigative Dermatology, Ritz Carlton Sheraton Hotel, Atlantic City, N. J., June 6-7. Dr. Herman Beerman, 255 S. 17th St., Philadelphia 3, Secretary.

Society of Biological Psychiatry, Claridge Hotel, Atlantic City, N. J., June 13-14. Dr. George N. Thompson, 2010 Wilshire Blvd., Los Angeles 57, Secretary.

Society of Nuclear Medicine, Palmer House, Chicago, June 18-20. Dr. Morris T. Friedell, 104 S. Michigan Ave., Chicago 3, Chairman, Press & Public Relations Committee.

South Dakota State Medical Association, Sheraton Johnson Hotel, Rapid City, June 20-23. Mr. John C. Foster, 300, 1st National Bank Bldg., Sioux Falls, Executive Secretary.

The Endocrine Society, Chalfonte-Haddon Hall, Atlantic City, N. J., June 4-6. Dr. Henry T. Turner, 1200 N. Walker St., Oklahoma City 3, Secretary.

Wyoming State Medical Association, Jackson Lake Lodge, Moran, June 11-14. Mr. Arthur R. Abbey, Box 2036, Cheyenne, Executive Secretary.

July

American Society of Facial Plastic Surgery, New York City, July 17. Dr. Samuel M. Bloom, 123 E. 83rd St., New York 28, Secretary.

American Society of X-ray Technicians, Shirley Savoy Hotel, Denver, July 4-9. Miss Genevieve J. Eilert, 16 14th St., Fond du Lac, Wis., Executive Secretary.

Oregon Cancer Conference, University of Oregon Medical School, Portland, July 16-17. Dr. Martin A. Howard, 1115 S. W. Taylor St., Portland 5, Ore., Chairman.

Rocky Mountain Cancer Conference, Brown Palace Hotel, Denver, July 22-23. Dr. N. Paul Isbell, 835 Republic Bldg., Denver 2, Chairman.

August

American Congress of Physical Medicine and Rehabilitation, Hotel Leamington, Minneapolis, Aug. 30-Sept. 4. Miss Dorothea C. Augustin, 30 N. Michigan Ave., Chicago 2, Executive Secretary.

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CARCINOMA OF COLON AND RECTUM

SURVEY OF SURGICAL MANAGEMENT IN CENTRAL NEW YORK STATE

Robert O. Gregg, M.D., Bruce E. Chamberlain, M.D.
and
Arthur A. Vercillo, M.D., Syracuse, N. Y.

Acute obstruction appears to be the complication of cancer most likely to end fatally. This survey of surgical practices in central New York state communities of varying size revealed a 22% operative mortality among patients admitted with this complication, contrasted with a 3.7% mortality among all other patients who underwent planned operation. In well over 60% of the former, clear-cut symptoms of obstruction had been present for more than three months. Anemia occurred less commonly in the entire series of 623 patients than is usually reported. This and the presence of an abdominal mass do not unfavorably affect prognosis except in lesions of the transverse colon, sigmoid flexure, or rectum. Anterior resection should be the operation of choice for most lesions in the upper part of the rectum or lower part of the sigmoid flexure.

WE, as a committee to survey the work of 32 fellow members of the Central New York Surgical Society, are presenting a review of the results of treatment of patients suffering from cancer of the colon and rectum, during the period 1947 through 1951. We believe that this survey represents a true picture of the behavior of and the management of cancer of the colon in upstate New York. The patients were all managed within a few miles of their homes by members of this society. It would appear that there was very little selection of cases in this series. The survey was conducted primarily to see how well our management measured up to that recorded by the major clinics and to find out in what respect we might improve our therapy.

In the course of analysis of these cases we made several observations which we believe are particularly worthy of general publication. 1. There was a lower incidence of anemia in this series than usually reported—in particular among patients who harbored carcinoma of the ascending colon. 2. Carcinoma arising below the pelvic peritoneal reflection represented a remarkably low percentage of all the cancers in this group. 3. In this group of cases anterior resection appeared to be the procedure of choice for lesions arising from 10 to 15 cm. from the anal verge. 4. We were able to arrive at some conclusion concerning the relative merits of the various types of intestinal preparation. 5. The lethal effects of acute intestinal obstruction were again emphasized, in terms of immediate surgical risk as well as in ultimate survival. 6. The prognostic significance of anemia and palpable mass was determined. 7. The age of the patient was found to be a most important factor in five-year survival.

Method of Survey

A résumé of each individual patient's record was submitted by the surgeon who had cared for the patient. All the case records were reviewed by this committee. The data submitted were therefore those of the 32 surgeons submitting case records on the colon. The conclusions from the analysis of the material are our responsibility.

Location of Lesions.—The intestine was divided into the usual segments for the analysis, except that we omitted the term rectosigmoid and considered all lesions found in this general area to be in either the sigmoid flexure or the rectum. Any growth whose lower border was at or below 14 cm. from the dentate line was arbitrarily considered to be in the rectum. Any lesion arising above this level was considered to be in the sigmoid flexure. Similarly, any lesion found at operation 3 in. or more above the peritoneal reflection was arbitrarily grouped in the sigmoid flexure, and any growth situated below this level was grouped in the rectum. The rectal lesions were divided into four groups: those rising above the peritoneal reflection, those involving the peritoneal reflection, those rising below the reflection from 5 to 9 cm. above the dentate line, and those arising from 4 cm. and below.

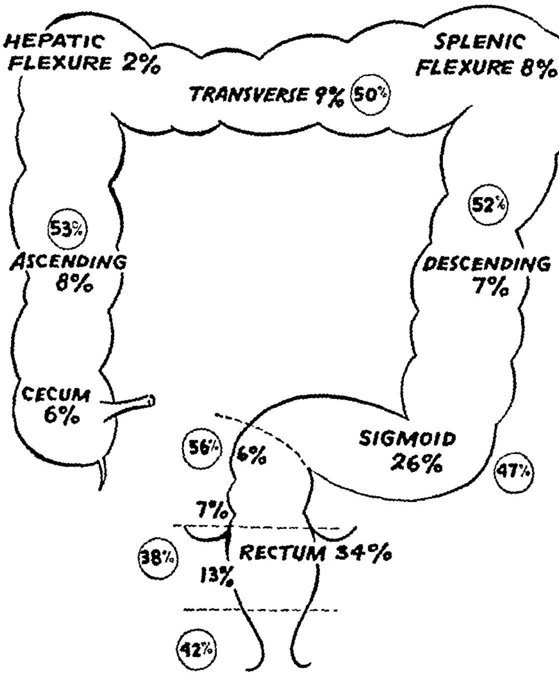


Fig. 1.—Distribution of carcinomas believed to be potentially curable. Percentages shown in circles indicate five-year survival rates of persons who underwent curative resections.

Definition of Terms.—The term anterior resection was reserved for those resections of the sigmoid flexure or rectum in which the superior hemorrhoidal artery was ligated proximal to at least one sigmoidal branch. If a less radical procedure was carried out the operation was labeled segmental resection. The term palliative resection was used whenever the surgeon, in his opinion, had left grossly visible or palpable cancer in the body of the patient at the conclusion of the surgical procedure. The term resection for cure, or curable lesion, was used whenever the surgeon, in his opinion, had removed all the grossly visible or palpable cancer from the body of the patient. The term five-year survival was applied to all patients alive longer than five years after operation whether free of disease or not. All patients lost to follow-up were regarded as dead.

Analysis of Records

The records of 623 patients who had been operated on were analyzed. Ninety-nine patients were subjected to various minimal palliative or first stage procedures. Hospital deaths occurred in 12 of those for whom a colostomy or cecostomy was established for relief of obstruction and for whom a second stage curative procedure had been planned. Palliative resections were carried out for 88 patients, leaving 436 patients for whom definitive resection for cure was possible. Of these patients, 23 died in the immediate postoperative period. Of this entire group, 213 were alive more than five years after resection.

Since in this survey we were dealing only with patients who had been operated on, we have no reliable criterion by which to judge operability. It should be pointed out, however, that in a similar survey of the Syracuse Medical Center the operability of cancer of the colon in about the same period of study was 96%. Resection of the primary lesion was thought to be desirable for 84% of the patients in this entire series subjected to exploration. Resection for cure was possible in 70% of the entire group. The five-year survival rate was 35% for all patients operated on, 41% for all patients in whom resection was carried out, and 51% for all patients leaving the hospital after resection for cure.

The distribution of single carcinomas believed potentially curable in the various segments of the colon is shown in figure 1. It can be seen that in this series only 34% of lesions were found in the rectum and only 21% in the extraperitoneal portion of the rectum. In 13 patients multiple carcinomas were found at the time of surgery and in 9 patients a second carcinoma of the colon developed subsequently in the period under study. Thus multiple *carcinoma developed in 5% of all patients, 3%* being synchronous and 2% metachronous.

The average age in this series was 62 years, somewhat older than in most series reported from some of the major clinics. The peak incidence by age was in the seventh decade. Females predominated in this group (270 to 254). Private patients outnumbered the ward patients about five to one in all age groups, with the exception that in the ninth decade the distribution was approximately equal.

Anemia.—Anemia severe enough to be manifested by a hemoglobin level of 11 Gm. or less per 100 cc. of blood occurred in 70 of 436 patients who were subjected to resection for cure. The incidence of anemia was highest among patients who harbored lesions of the ascending colon and progressively decreased in patients with lesions of the transverse colon, splenic flexure, descending colon, sigmoid flexure, and rectum. In this series only 36% of the patients in whom a curative resection of the ascending colon had been carried out and less than 10% of the patients exhibiting similar lesions of the sigmoid flexure and rectum could be classed as anemic.

Palpable Mass.—A palpable mass was found in 70 patients among 270 with potentially curable lesions in the colon above the rectum. Since an additional 215 patients had lesions that could be felt rectally or visualized by sigmoidoscope (fig. 1), there was a total of 285 patients, or 65% of the entire group, whose lesions could be seen or felt. In the patients with lesions of the ascending and transverse colon, approximately 40% of the lesions could be palpated, whereas only 16% of those of the descending colon could be felt.

Complications and Mortality.—In table 1 we have made a careful listing of all complications and deaths. We also tried to determine the underlying causes for these unfortunate occurrences. Males showed an 8% mortality in contrast to 5% in females. The risk of operation progressively rose in each decade past the age of 60. It is noteworthy that 170 resections of the colon proper were carried out in patients under the age of 60 with no deaths. Venous and arterial thrombosis and their consequences accounted for one-third of all complications. Pulmonary emboli likewise accounted for one-third of all deaths.

Table 1.—*Complications and Mortality in Patients with Carcinoma of Colon and Rectum in Whom Resection Has Been Done*

Causes	Nonfatal	Fatal	Total
Thromboembolic			
Phlebitis	19	..	19
Pulmonary embolism	7	8	15
Mesenteric thrombosis	..	2	2
Portal venous thrombosis	..	1	1
Cerebral thrombosis	1	1	2
Total	27	12	39
Infectious			
Peritonitis and abscess	31	5	36
Fistula	17	..	17
Dehiscence	7	..	7
Total	55	5	60
Miscellaneous			
Obstruction	10	2	12
Pulmonary	9	2	11
Urinary	22	..	22
Cardiac	..	7	7
Shock	1	2	3
Transfusion reaction	5	1	6
Bleeding	..	2	2
Other	10	2	12
Total	57	18	75

The use of antibiotics was not effective in preventing all infectious complications, since peritonitis occurred in 8% of cases and accounted for one-fifth of all deaths. Anastomotic leakage with fistula formation occurred in 5% of all patients in whom intestinal continuity had been reestablished. Wound dehiscence was surprisingly infrequent, occurring in less than 1 in 50 patients. Urinary complications, usually retention, occurred to a significant degree in 4% of all patients, and most of these occurred after combined abdominoperineal resection. Obstruction of the small intestine was present in a total of 10 patients. In two of these it was the cause of death. Transfusion reactions occurred in five patients and proved fatal in one of these.

Table 2.—*Influence of Preparation of Intestine, Prior to Operation, on Infectious Complications in Patients with Carcinoma of Colon and Rectum*

Type of Preparation	Total Elective Cases	Abscesses and Fistulas	
		No.	%
Sulfonamides	215	17	8
Sulfonamides and broad-spectrum antibiotics	61	4	8
Broad-spectrum antibiotics	86	6	7
Cathartics and enemas	49	6	10
None	10	0	

Acute Obstruction and Mortality.—Six deaths after elective resection occurred among 68 patients who had survived decompressing procedures for acute obstruction. If we add to these the 12 patients who died after first stage cecostomy or colostomy and for whom a second stage definitive operation was planned, we find a total of 18 deaths among 80 patients, otherwise potentially curable, who were admitted to the hospital for acute obstruction of the colon. This gives a 22% over-all mortality in this group compared to 3.7% in the group not showing acute complete obstruction.

Preparation of Intestine.—In table 2 we have shown a comparison of the incidence of complications among patients in whom the intestine was unprepared, prepared with sulfonamides (usually succinylsulfathiazole [Sulfasuxidine]), or prepared with broad-spectrum antibiotics (usually oxytetracycline [Terramycin]) or a combination of sulfonamides and broad-spectrum antibiotics. It can be seen that there was little difference in results when sulfonamides, broad-spectrum agents, or a combination of both was used. Infectious complications appeared to be only slightly more frequent when such preparation was omitted.

Closed Versus Open Anastomosis.—Although the closed technique anastomosis was not commonly used in this series, neither infectious complications nor fistula were reported in this particular group of 32 patients. However, one obstruction due to diaphragm formation did occur.

Combined Abdominoperineal Resections Versus Anterior Resections.—There were 10 deaths, 9%, among 113 patients subjected to combined abdominoperineal resections for cure, whereas there were 4 deaths (3%) among 141 patients who underwent anterior or segmental resection for cancer of the upper part of the rectum and sigmoid flexure. That combined abdominoperineal resection is a serious operation, particularly in the elderly, is attested by an 18% mortality in those operated on in the eighth decade, an age group in which anterior resection carried but a 5% mortality.

Factors Influencing Five-Year Survival

Age.—In figure 2 we have charted the percentage of five-year survivors as well as the five-year expected mortality as predicted in the United States Life Tables of 1950 for the various age groups. The falling death rate from cancer with advancing years is overbalanced by a rising rate from other causes. Whereas at ages 30 to 39 the ratio of cancer deaths to those from other causes is about 20 to 1, it falls progressively to 6 to 1 at ages 40 to 49, 3 to 1 at ages 50 to 59, 5 to 4 at ages 60 to 69, and 1 to 2 at ages 70 to 79. It is perhaps somewhat due to patient selection that in the patients aged 80 to 89 the percentage of survival was as good in the operated group as in the general population.

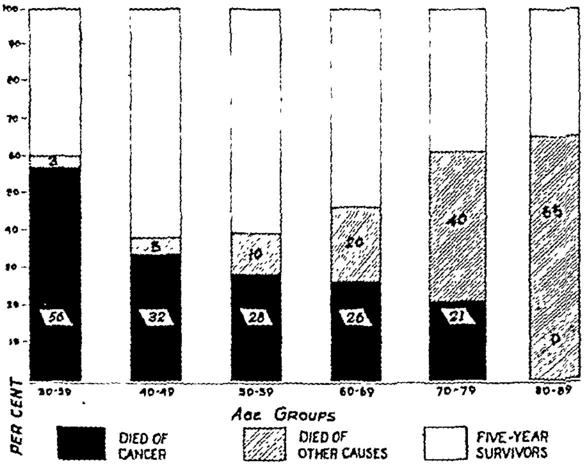


Fig. 2.—Influence of age on mortality from cancer in patients who underwent resection for cure.

Site of Lesion.—It is shown in figure 1 that there is relatively little difference in survival rate according to site except that a poor prognosis is evident for patients in whom the extraperitoneal portion of the rectum is involved. The five-year survival rates were 40% for patients with involvement of the extraperitoneal portion of the rectum, 47% for the sigmoid flexure, 52% for the descending colon and the splenic flexure, 50% for the transverse colon, and 53% for the ascending colon.

Anemia.—The five-year survival of anemic patients who at operation had a curable lesion was not particularly different than the cure rate for the entire group. It is even possibly significant that the cure rate for curable cancer of the ascending colon in the presence of anemia was considerably better than for the entire group—70% as compared to 53%. However, if we include all anemic patients we find that the over-all cure rate is somewhat worse for the entire group than with patients who did not suffer anemia. Analysis showed that 37% of patients who were anemic and had cancer of the ascending colon survived the five-year period, whereas 33% of all nonanemic patients with lesions at the same location survived the five-year period. This includes all patients. Prognosis for patients with such lesions involving the descending colon was somewhat worse but not hopeless—25% as compared to 35%. Anemia, however, in the presence of a carcinoma of the rectum was a particularly bad prognostic sign, since only one-sixth, or 16%, of these patients survived five years, whereas 40% who were not anemic survived this period.

Palpable Mass.—The five-year survival rate among patients harboring a cancer of the ascending colon whose lesions were palpable through the abdominal wall was equal to that found in the patients whose lesions were not felt (17 of 37). We regard palpation of such a lesion as a poor prognostic sign in the transverse colon, since only 5 of 22 patients with such palpable growths survived five years. The prognosis for patients having palpable lesions of the descending colon was not quite as good as those with lesions not felt (15 of 35) but was much better than for those in whom lesions of the transverse colon were felt.

Acute Obstruction.—Acute intestinal obstruction for many years has been regarded as a poor prognostic feature in association with carcinoma of the colon. If we consider only patients operated on for cure, the survival rate of 35% among patients with obstruction is compared to 54% for all other patients for whom resection for cure was carried out. If we consider all patients originally operated on, the cure rates are 25 and 36% respectively. Analysis of these patients' records for other serious prognostic features showed there was not a higher incidence of lymph node metastasis, serosal extension, or local fixation than in the remainder of the group.

Perforation.—In 24 patients gross perforation of cancer had occurred. Eighteen resections were regarded as curative and six for palliation only. Three deaths occurred among eight patients for whom emergency resection was carried out. Rather surprisingly, 5 of these 18 patients subjected to so-called curative resection in the presence of frank perforation of the colon survived the five-year period.

Local Fixation.—Local fixation of a lesion to a locally resectable site was not necessarily a bad prognostic sign. Among 20 patients whose lesions were in the ascending colon, splenic flexure, or the descending colon, there were 13 five-year survivors when resection was carried out with a view to cure. There were 7 survivors among 19 whose lesions were in the sigmoid flexure. However there were but 2 survivors among 18 patients with fixed cancer of the rectum. It is apparent from these figures that the prognosis is not necessarily bad if one is capable of removing en bloc the carcinoma with its zone of contiguous spread, such as is usually possible in cancer of the intestine involving either flank.

Scrosal Extension.—There was surprising little difference in survival rate between the group of patients whose lesions showed serosal extension (48%) and those whose lesions had not broken through the full thickness of the intestinal wall (54%).

Microscopic Grade.—A relatively small percentage of the growths in this series were graded according to Broders' index. This fact has prevented a fully accurate report of the effect of this factor on five-year survival in this series. However, of 149 patients whose carcinomas were graded 1 or 2 according to Broders' classification, there were 76 five-year survivors (51%), whereas there were 24 survivors (40%) among the 59 patients whose lesions were of high grade 3 or 4. Patients with mucin producing carcinomas showed a 32% five-year survival, whereas there were 99 survivors of the 161 (61%) patients whose lesions were ungraded.

Nodal Metastases.—The absence of nodal metastases was a reasonably good sign for patients with lesions at all levels. The presence of lymph node metastases offered only a slightly poorer prognosis for the colon, being 43% for the ascending colon and 45% for the remainder of the colon proper, but was of serious portent in the presence of cancer of the rectum. Only 26% of patients with rectal lesions survived the five-year period.

Combined Abdominoperineal Resection Versus Anterior Resection

Although combined abdominoperineal resection was rather infrequently carried out for lesions of the upper part of the rectum in this series, certain comparisons can be made with anterior resection. The five-year survival rates applied to lesions at identical levels, 9 to 15 cm., were approximately equal. A breakdown of the cases as to the presence of lymph node metastases showed little difference. Similarly, the distribution of the lesions with serosal spread was practically identical between those operated on by either method. There were 23 five-year survivors among the 45 patients submitted to anterior resection and 12 five-year survivors among the 25 patients subjected to combined abdominoperineal resection. All that we can state is that in this series there was no demonstrable superiority for either operation in terms of five-year survival. As we have shown previously, the mortality after combined abdominoperineal resection was approximately three times as great.

Comment

We believe this survey is unique in that cases from many surgeons from small and relatively large cities are included. Some of these surgeons work in teaching centers, others have no house staff. We believe the case material studied is representative of not only the true picture of colon cancer as seen in this part of New York state but also the current standards of surgical treatment of this disease in this area. The incidence, by site, sex, and age, is undoubtedly accurate. The operability and curability are in close agreement with other reports.

Hospital complications and causes of death have changed since the advent of antibiotics. Whereas peritonitis still is a serious problem, vascular complications, both venous and arterial, have assumed a major roll in morbidity and mortality.

Acute obstruction still appears to be the complication of cancer most likely to end fatally. When we consider that well over 60% of the patients who entered the hospital because of acute intestinal obstruction had had clear-cut intestinal symptoms for more than three months, we realize that much of this mortality could have been avoided by more prompt diagnosis. There is some factor about obstruction which not only is more apt to be more immediately lethal but, if the patient survives the initial obstructive episode, appears to increase the possibility of metastasis. Possibly the enormous pressures built up in the intestine force cancer cells in increasing numbers into the blood stream, although to our knowledge there is no proof of this theory. Certainly we all know that cancer cells are often pushed in the blood stream in the course of operative manipulation, and it would appear that the pressures built up in the colon in the course of the acute obstruction of the large intestine would be many times that produced by the surgeon in the ordinary surgical procedure.

From the results of this study we can hold no brief for a specific type of preoperative preparation except to state that the nonabsorbable sulfonamides and the broad-spectrum antibiotics either alone or used in combination did not always prevent infection. There seemed to be slightly fewer complications in the patient whose intestine was thus prepared than in those in whom no preoperative chemotherapy or antibiotic was used, although the differences were not great. Possibly some of the newer types of preparations, the combination of sulfonamides and neomycin sulfate, may in fact be superior to those which were used during this period.

Anemia in this series was slightly less common than in other series reported, especially when considering cancer of the ascending colon. These lesions were diagnosed somewhat earlier, anemias had been treated, or our criterion for anemia was slightly more strict than that used in some other series. The presence of anemia did not appear to unfavorably affect prognosis except in cases of cancer of the transverse colon and rectum.

An abdominal mass was palpated in approximately 30% of patients whose disease was in the body of the colon. As in anemia, the presence of the mass did not influence the prognosis except with lesions of the transverse colon and the sigmoid flexure.

We tried very carefully in this series to assay the comparative results of combined abdominoperineal resection and anterior resection when applied to patients suffering from carcinoma of the upper part of the rectum from 10 to 15 cm. As far as we could determine, the prognosis was equal. The morbidity and mortality of combined abdominoperineal resection was considerably greater, particularly when the operation was carried out on the elderly; the over-all mortality of combined abdominoperineal resection was 9% and, of anterior resection, 3%; in patients past the ages of 70 the figures were 18 and 5% respectively. The facts speak for themselves. It would appear that if 3 in. of normal intestine can be removed distal to the lower border of the lesion and if the middle hemorrhoidal pedicles are included in the specimen, anterior resection should be the procedure of choice for lesions involving the colon from 10 to 15 cm. It is noteworthy that in 74% of all patients in this series continuity of the intestine was restored without loss of sphincteric action.

Summary and Conclusions

Case records of 623 treated patients suffering from cancer of the colon and rectum were reviewed. Five-year survivals occurred in 35% of the entire series, in 41% of all patients whose growths were removed, and in 51% of all patients who left the hospital after resection for cure.

Thirty-four per cent of carcinomas were found in the rectum but only 21% of the entire group within the extraperitoneal portion of the rectum. Less than 50% of all malignancies could be felt or seen by the sigmoidoscope, but an additional 15% could be palpated through the abdominal wall. Thirty per cent of the carcinomas of the colon proper could be felt transabdominally. The presence of an abdominal mass involving either flank did not materially worsen the prognosis.

Anemia occurred less frequently in this series than usually reported. Only 36% of patients who suffered carcinoma of the ascending colon showed a low hemoglobin level. Anemia was not of serious prognostic import except in dealing with cancer of the transverse colon or the rectum.

There was a 22% operative mortality among the patients who entered the hospital because of acute intestinal obstruction and for whom curative resection was planned, as contrasted with a 3.7% mortality among all other patients who underwent resection for cure. Five-year survival, including hospital survival, was 35% in the obstructed group and 54% in the nonobstructed group. Preparation of the colon with either enteric sulfonamides or broad-spectrum antibiotics resulted in a slightly decreased incidence in infectious complications and fistula formation.

The mortality after combined abdominoperineal resection was three times that of anterior resection when applied to patients with lesions of the upper part of the rectum and sigmoid flexure, whereas the five-year survivals were not appreciably different.

A very important prognostic feature was age. The death rate from cancer in five years among the group in whom resection for cure was carried out progressively fell with each decade from 56% in the fourth decade to only 21% in the eighth decade.

Curable carcinoma of the ascending colon is not usually associated with anemia. The occurrence of anemia, the presence of abdominal mass, or local fixation does not unfavorably affect the prognosis except in patients with lesions of the transverse colon, sigmoid flexure, or rectum. Intestinal obstruction is the single greatest factor of bad portent in terms of both the operative and the long-term survival. Anterior resection, when technically feasible, should be the operation of choice for most lesions in the upper part of the rectum or lower part of the sigmoid flexure.

405 Medical Arts Bldg. (2) (Dr. Gregg).

FOODS STERILIZED BY GAMMA RADIATION.—In the Metabolic Ward of the Medical Nutrition Laboratory, studies with human volunteers of forty irradiated foods stored and frozen, and some stored at room temperature, have been completed. The volunteers have been checked by a battery of clinical tests, such as liver and kidney functions, blood counts, electrocardiograms, x-ray examinations, and determinations on the urine and feces. Follow-up examinations have also been accomplished after six and twelve months. To date, no evidence of toxic effects from consumption of irradiated foods has been revealed. There is no significant difference in metabolizable energy or digestibility between irradiated and non-irradiated foods. There is no consistent pattern as to acceptability of irradiated foods. Herbert Pollack, M.D., Wholesomeness of Irradiated Foods, *Journal of the American Dietetic Association*, March 1959.

THE CANDIDATE FOR CORONARY HEART DISEASE

DISCRIMINATING POWER OF BIOCHEMICAL HEREDITARY AND ANTHROPOMETRIC MEASUREMENTS

Menard M. Gertler, M.D., Max A. Woodbury, Ph.D., Lida G. Gottsch, M.D., Paul D. White, M.D.
and
Howard A. Rusk, M.D., New York

It is desirable to develop criteria with which to judge whether given persons or groups of persons are likely to have coronary heart disease later in life. The technique of discriminant function analysis of variance has been applied to data on 100 normotensive patients under the age of 40 with coronary heart disease and to 146 putatively normal subjects. The presence or absence of coronary heart disease was correlated with the logarithms of height and of total serum cholesterol, serum phospholipids, and serum uric acid levels and with four anthropometric indexes and familial incidence. The highest correlation was between coronary heart disease and total serum cholesterol level. There was a negative correlation with stature, the taller subjects being less likely to develop coronary heart disease. The correlations found have been combined in a multiple regression equation which has a measurable predictive value in groups of persons and promises to be useful as a research tool.

There is a growing interest in the relationship between certain biological characteristics and proneness to cardiovascular disease.[1] Such a relationship, when it can be clearly established, could be very useful for predictive purposes. Considerable preliminary work has to be done, however, before predictive experiments can be designed. In developing some means for preselecting "normal" persons for detailed study, it is difficult to establish what is to be considered normal because it is apparent that many presumably healthy persons are incubating chronic cardiovascular disease.

Enormous strides have been made in controlling the acute infectious diseases because of the success of epidemiologic studies coupled with the advances in therapeutics. One of the consequences of an effective program in controlling the acute infectious diseases is the rise of the age at death in the American population from 45 years of age in 1900 to 73 years of age in 1957.[2] The rise in longevity in the American population has contributed to a large extent to the rise in mortality and morbidity due to cardiovascular disease, cancer, and arthritis. Along with this greater longevity, the entire population will increase from 170 million in 1956 to 225 million in 1980.[2] Thus, the population not only will increase in actual numbers but will be an older population. It has been calculated that, in 1900, only 13.6% of the population was over 45 years of age while, in 1980, according to estimates, 43% of the population will be over 45 years of age.[2] Accordingly, the problem of chronic disease will become of increasing importance and major concern.

There is no doubt that the successful prevention of coronary heart disease will begin by recognition of the disease in its incipient form and delay of the onset of the disease by preventive measures. In 1951, a report by Gertler, Garn, and White [1a] suggested the possibility of preselecting from putatively healthy persons those who may be candidates for coronary heart disease. This method of preselection was based on the presence of a combination of factors in a healthy, noncoronary group similar to those observed in a coronary heart disease group. Shortly after this communication was published, other workers attempted to predict proneness to coronary heart disease by elevation of levels of serum lipoproteins in conjunction with blood pressure [1b] or by a combination of serum cholesterol level, blood pressure, and weight.[1c] These latter two methods of preselection have demonstrated that, by a critical assemblage of the variables mentioned, a better measure is obtained of the person as a candidate for coronary heart disease. These methods do not include such important measurements as height in relationship to weight, body build, heredity (mother, father, and siblings), and levels of individual lipids (cholesterol, lipid phosphorus). It is, therefore, reasonable to suggest that by including additional variables which are known to differ significantly in a normal healthy group and a proved coronary disease group a higher degree of discrimination of potential candidates for coronary heart disease will be possible. It should be emphasized at this juncture that, as additional criteria are uncovered, the possibility of such discrimination for the person will be greater.

A preliminary statistical study undertaken in conjunction with the statistical division of the International Business Machines Corporation Service Bureau indicated that the technique of discriminant function analysis of variance with use of an electronic computer would be valuable in "correlating" and "weighing" the individual characteristics from the normal group so that they might form the basis of preselection individually with a very high degree of discrimination.

From the Institute of Physical Medicine and Rehabilitation, New York University College of Medicine.

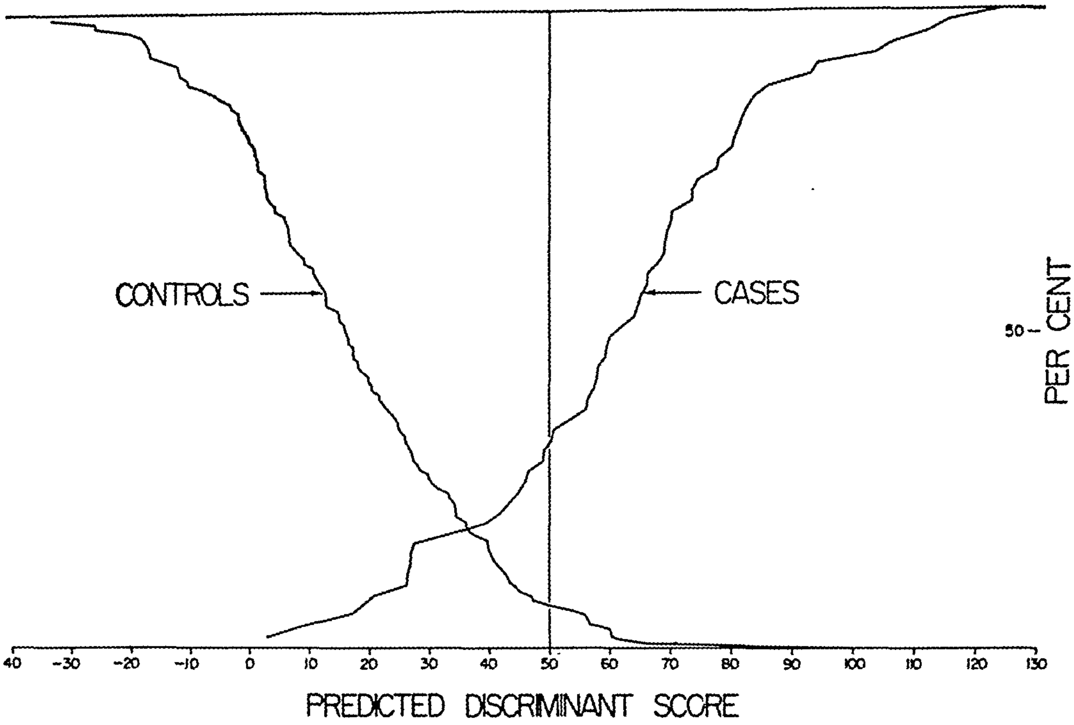
Methods, Materials, and Techniques for Analysis

Considerable data have accumulated in recent years to indicate a relationship of various specific factors to cardiac disease. By means of such relatively simple statistical procedures as the "t" and "F" tests, it is possible to show significant associations between specific factors and heart disease, e. g., serum cholesterol level and coronary heart disease. On other suspected factors, data continue to accumulate but positive correlations have not yet been established. It remains to effect some way to determine where an unknown, i. e., an individual, fits in relationship to the probability of having or not having heart disease. In other words, it is desirable to make some discrimination between persons or groups as to whether coronary disease may or may not occur in advance of the onset of the disease.

If, for example, the total cholesterol level for the diseased group and the controls is examined, it is found that the diseased group has the higher total cholesterol level on the average but that there is considerable overlap. Similarly, the two groups differ with respect to several other variables. Each of the variables will furnish poor material for discrimination, but a combined score may well be much better. The question of which particular combination to use to best discriminate the two groups has been subjected to precise quantitative evaluation. The resulting methodology was shown by Fisher[3] to be equivalent to the use of the multiple regression equation obtained when the variable to be predicted (the dependent variable) is chosen to be, say, 0 for one of the groups (here the control group) and 100 for the other group (here the coronary heart disease group). The predicting (independent) variables are the biochemical, genetic, and other factors which could be measured prior to the overt manifestation of the disease, for example, the total serum cholesterol level mentioned above.

The selection, composition, and type of studies conducted on the coronary heart disease group and the control group have been described in great detail elsewhere.[1d] The multiple regression equation used here as a discriminator is based on the original findings in these two series of persons.

In the initial study, a discriminant analysis of the data was made with use of the following variables to calculate a score which would best distinguish between control cases and disease cases: height, weight, ponderal index (height over cube root of weight), total serum cholesterol level, ratio of total cholesterol and phospholipids levels, ratio of total cholesterol, serum uric acid, and phospholipids levels, endomorphic index, mesomorphic index, ectomorphic index, and presence of coronary heart disease in mother, father, and sibling(s).



Percentage of cases and normals misclassified as function of discriminant score. Cases are plotted from left to right and controls from right to left for facility in indicating percentage of misclassification.

The resulting discrimination was good, but it was believed that an improved analysis should be made by transforming the biochemical and physical measurements to logarithms. In this form the various ratios could be replaced by the original variables. In the initial analysis there was a larger dispersion of discriminant scores within the coronary group than within the control group. It was expected, and such proved to be the case, that this heterogeneity would be corrected in the second analysis, performed by the computing laboratory of the New York University College of Engineering, Research Division.

In order to delineate better the principle used to obtain the discriminant scores, it may be worthwhile to note that the weights on the various contributing scores in the discriminating combination are so chosen to make the variation of the scores within the diseased group and within the control group as small as possible while keeping the difference between the groups large. There is, naturally, some dispersion of the discriminant score, but high values are associated with persons with coronary disease and low scores with control subjects. A dividing point of 37 on the discriminant score (see figure)—which does not involve the dependent variable but which might help predict it in advance of the onset of the disease—correctly classified 81% of both groups. Thus, 81% of those with coronary disease had a score above 37 while only 19% of the controls were found to have such a score, and 81% of the controls had a score below 37 while only 19% of those with coronary heart disease scored below this dividing point. If it were necessary to predict the proneness for coronary heart disease of every "unknown," it would be possible to classify about 81% of the subjects correctly. If one limits the scores to above 87 or below 0, it is possible to classify over 98% of the selected persons correctly. About 12.5% of those with coronary disease and 12.5% of the controls fall within these ranges, thus permitting a modest percentage of the entire population to be classified with a great degree of certainty.

Results

One hundred patients with well-documented "pure" coronary heart disease and 146 control (putatively normal) subjects in this series were first studied in 1947. Thirty-nine patients with coronary disease and 11 control subjects were not included in this discriminant analysis because data were incomplete. The means and standard deviations of all the variables included in this study were not affected sufficiently to alter the validity of this analysis by the absence of these data. By calculation of discriminant scores with various combinations of one or more independent variables, certain factors could immediately be eliminated from consideration. Thus, it was found that body weight was not a significant variable, although it is to be noted that this is under conditions of normal blood pressure. This bears out findings from a previous study.[4] Ponderal index was eliminated in favor of the significant portion of the index, i. e., height. Analyses to date (see table) indicate that the taller the subject is the less likely will coronary heart disease be present, i. e., a negative correlation. The mesomorphic index appears to be significant in the discrimination. This suggests that it may be a somatic indicator of the genetic type of person predisposed to coronary heart disease. Ectomorphic and endomorphic indexes and some of the "logical" combinations of the presence of coronary heart disease in parents and/or siblings were not found to be significant. When coronary heart disease appears in the family, it is more significant if both parents have it, with occurrence in father and sibling(s) or mother and sibling(s) of slightly lesser significance, as seen from the order in which they enter the step-wise regression. The ratios of cholesterol and phospholipids levels and total cholesterol, serum uric acid, and phospholipids levels were less effective as variables than the logs of each of the actual blood chemistry readings. Phospholipid level is also slightly negatively correlated, although there is a complex interaction between this factor and the serum cholesterol level, which shows a strong position significance. This has a biochemical bearing which is beyond the scope of this paper.[5] This relationship is expected to be the object of further study. Inclusion of blood uric acid level in the analysis does not improve the discriminant score to any great degree.

Results of Analysis

Coronary Discriminant Analysis

X_1	Log of height		
X_2	Log of total cholesterol level		
X_3	Log of phospholipids level		
X_4	Log of uric acid level		
X_5	Mesomorphic index		
	Disease in Family		
	Mother	Father	Siblings
X_6	+	+	—
X_7	+	—	+
X_8	—	+	+

$Y = X_9 = (100 = \text{coronary}, 0 = \text{control})$

Correlation Coefficients

$X_{1\ 9}$	— 0.29747
$X_{2.9}$	— 0.48992
$X_{3.9}$	— 0.11189
$X_{4.9}$	— 0.24837
$X_{5.9}$	— 0.24796
$X_{6.9}$	— 0.21938
$X_{7.9}$	— 0.17081
$X_{8.9}$	— 0.18548

Final Equation in Step-wise Procedure

$$Y = 898.28 - 546.15X_1 + 218.29X_2 - 94.75X_3 + 63.19X_4 + 6.35X_5 + 38.86X_6 + 57.23X_7 + 48.41X_8$$

Order of Selection of Variables in Regression

$X_2, X_6, X_1, X_7, X_5, X_3, X_8, X_4$

Comment

It is believed (based on preliminary studies, subsequent follow-up work, and confirmation by several groups) that coronary heart disease is a gradual process culminating in the overt symptomatology and only then recognizable. There were certain composite features of the coronary heart disease group which were occasionally found in subjects in the putatively normal group, i. e., body build, hereditary history, and serum lipids. It is reasonable to suggest that since coronary heart disease is a gradual process perhaps some of these covert characteristics may prove to be a clue to the underlying disease process and a future cardiac episode. Accurate individual prediction of the probability of experiencing coronary heart disease would make it possible to institute preventive measures to delay or forestall the initial coronary episode. This study is at present being expanded to increase the accuracy of individual prediction which will then make preventive therapy highly selective and realistic. It should be emphasized at this juncture that the present discriminating formula is to be used only for preselecting subjects for further study of characteristics of coronary heart disease and not for predicting the presence or absence of coronary heart disease in the individual case.

Summary

In a population such as exists in the United States today, where the acute infectious diseases are virtually controlled by advanced public health and chemotherapeutic procedures, there is a tendency toward the development of chronic diseases, especially those of cardiovascular origin. A recent study delineated certain characteristics common to both a control or putatively healthy group of men and a group of men who had experienced coronary heart disease. There appears to be a statistical relationship between proneness toward the disease and certain critical variables. Although this scheme of classification is useful in predicting the proneness to coronary heart disease in groups of persons, the formula will be used as a research tool to preselect persons for further clinical investigation in an attempt to delineate proneness to coronary heart disease in biochemical terms.

550 First Ave. (Dr. Gertler).

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WHY ARE MEN'S CORONARY ARTERIES SO SCLEROTIC?

William Dock, M.D., Brooklyn, N. Y.

Both genetic and dietary factors are discernible in studies of the cause of coronary atherosclerosis. There are individual variations in the extent of development of supportive and contractile structures in the intima; in addition, certain effects of race, sex, and environment appear. Especially striking is the appearance of cholesterol deposits during the first year of life and their subsequent disappearance, alike in rabbits and in children, after weaning. The rate of infiltration decreases in childhood and is accelerated at adolescence in men and after the third decade in women. These considerations, with other results of recent investigations, indicate that the most important factors in coronary disease are nutritional and metabolic and that the greatest fault lies in the masculine love for rich food, alcohol, and tobacco.

Soldiers who have died of coronary disease have shown a striking predisposition to atheromatosis in the large arteries lying in the epicardium, since most of these young men had no other visible atheromas.[1] That this predisposition had an anatomic basis was apparent from the descriptions of the peculiar intimal supports recorded by histologists long ago. These spiral or longitudinal intimal bands, with longitudinal muscle and abundant ground substance, collagen, and elastic fibers, are found in the coronary arteries of many mammals and birds and are present before birth. Individual variation in the extent of development of these structures is great, and it has been suggested that part of the familial susceptibility to coronary disease may be due to familial variations in this anatomic predisposition to local accumulation of lipid as well as in metabolic or dietary factors which would affect over-all arteriosclerosis.[2] It also was noted, and has

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From the State University of New York College of Medicine, Downstate Medical Center.

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since been confirmed, that from birth onward males have thicker and *more extensive intimal* cushions than females.[3]

Comparative Incidence

That men suffer from angina and die from coronary disease earlier in life than women has been obvious to all students of these disorders for 186 years. For *almost* as many years, pathologists have noted that aortic atherosclerosis is slightly more marked, at any age, in women than in men. During the past decade it was shown that estrogens, in chickens, modify the pattern of plasma lipids and decrease coronary but not aortic atherosclerosis.[4] In men they also decrease and androgens increase *the fraction of cholesterol* bound to beta *lipoprotein*. It is this fraction, poorer in phosphorus and lecithin and less dense than alpha lipoprotein, which is found in elevated levels in animals developing atheromas on diets enriched with cholesterol and saturated fatty acids. Its level is also higher in victims of coronary disease than in controls of the same age and sex, that is, in persons in whom the evidence of atherosclerosis has not become manifest. On the basis of such observations, and one report on a great decrease in coronary sclerosis in patients with prostatic cancer who had had more than three months of estrogen therapy, several large studies of estrogen administration in coronary disease are now under way. The review by Oliver and Boyd[6] of 50 such patients, carefully matched with alternate controls and all selected three months after their first infarction, shows no difference in the total of fresh coronary occlusions and coronary deaths after 30 months, when 14% of them were dead and 14% more had survived second infarctions.

Another factor of great importance in sclerosis of the coronary arteries is thrombosis. Most American workers consider this as secondary to ulceration of atheromas, but Duguid and Robertson[7] and other British authorities regard the atheromas of men as organized and degenerated thrombi. These pathologists see no relationship between human arterial disease and the lesions evoked in rabbits, chickens, and monkeys by diets enriched with the lipids which are abundant in the foods enjoyed by prosperous people prone to coronary disease. In any event, a sex difference in mast cells which produce heparin[8] and sex differences in blood coagulability of men and women, as well as of patients with coronary disease as compared to controls,[9] may prove to be additional factors in explaining the epidemiology of myocardial infarction. Since one-third to three-fourths of the Americans who died from this disease, and whose cases were studied in various institutions, had no recent thrombosis, it seems unlikely that much of the sex difference can be due to difference in coagulability.

Two relatively recent studies have put the whole question of masculine predisposition to coronary disease in an entirely new light. One is the report of Keil and McVay[10] showing that in Atlanta, Ga., 37% of the new cases of coronary disease in Negro women occurred before the age of 50 and 66% before 60, while in Negro men the corresponding percentages were 22 and 48. In Caucasian patients at the same hospital only 7% of the cases in women occurred before the age of 50 and 21% before 60, while in Caucasian men the percentages were 14 and 38. Analysis of the material indicated that the reversal of sex difference in Negroes could not be explained by artificial menopause, hypertension, or obesity. In New Orleans[10A] it was noted that aortic atheromas increased rapidly during adolescence in Negro girls, as well as in both Negro and Caucasian males, but slowly in Caucasian females. Differences in estrogen and androgen production or metabolism may affect atherogenesis in females of these two races. Such a possibility is suggested by the report of Bauld and co-workers[11] that men with coronary disease given 17-beta-estradiol excreted more estriol than did control subjects.

At present, all that can be said is that Caucasian males everywhere, and Negro women in Atlanta, are prone to early onset of myocardial infarction as compared with the opposite sex of the same race. This may mean that there are racial differences in the anatomy of the coronary intima or in the effect of estrogens on coronary sclerosis which reverse the classic sex predisposition. It *may mean* that in some cultures diet, lack of physical activity, and the reaction to emotional stress predispose men, and in other cultures they predispose women, to develop infarction before the sixth decade.

Lober's[3a] study of coronary intimal infiltration from birth to old age in the Minneapolis population *provides equally surprising information (fig. 1)*. Here the rate of change in the intima was found to be greatest in the first year of life, confirming Bragdon's[12] observations on cholesterol deposition in the intima of suckling rabbits and the "suckling's cholesterosis," familiar to European students of human pathology. In rabbits and in children weaned from milk, these deposits vanish quickly. But in the Minneapolis population this infantile disorder is not outgrown, since the diet always contains milk and eggs. The rate of infiltration decreases in childhood and is accelerated at adolescence in men and after the third decade in women. Even in infancy and childhood infiltration is more marked in males. The rate of coronary intimal infiltration reaches its lowest level in girls 10 to 20 years old and more than doubles in males between the ages of 10 and 20, when androgen production and appetite for rich food are maximal. It then falls rapidly for a decade in men and more slowly thereafter, reaching the same level at 70 years as that at 10 years. Most of the decline after the age of 50 must be due to deaths from coronary disease eliminating those with advanced lesions from the entire population.

In girls the rate begins to rise only after the age of 15, and the peak, at 30, though lower than in males of 20, is slightly above that in males all through the fourth and later decades. There is no rise in the rate of infiltration in women at the time of the menopause. Lober's [3a] data show only a slower fall in elderly women than in men. It is the relatively high rate of infiltration of the intima prior to and in the decade after puberty that accounts for the greater sclerosis noted in Caucasian men as compared with women. The average infiltration rate in women 50 years of age is the same as that in men of 38. Lober's data show that, from the ages of 30 to 50, women form intimal deposits as fast or faster than men, in spite of the low androgen-estrogen ratio at that age.

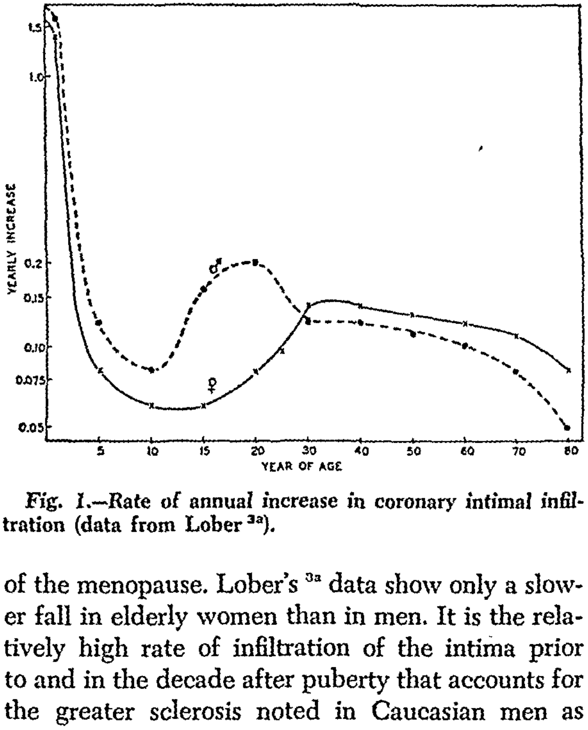

Fig. 1.—Rate of annual increase in coronary intimal infiltration (data from Lober [3a]).

Coronary atherosclerosis resembles the formation of sand bars in a river bed. In a large river, hundreds of feet of silt are deposited before there is any risk of a ship going aground. Lober's [3a] study shows that the coronary intima, averaging less than 10% of the whole arterial wall at birth, exceeds 50% in men 25 years of age and 70% in men dying of coronary disease. By the age of 30 the average man in Minneapolis was found to have coronary atherosclerosis that was 65% as severe as that of men who died of coronary disease at that age; by the age of 50 the average was 82% of the lethal degree of intimal infiltration. Of course these averages cover a wide range: a few men 50 years of age have scarcely any lipid infiltrations and others dying of accidents or tumor show greater total infiltration than men dead of coronary disease with small but strategically located lesions.

Women at the age of 50 have an average severity of coronary disease 90% as marked as men of that age and 70% as great as that of those who die of coronary disease. Since most of this disease in women developed between the ages of 25 and 50, when estrogen production was high, it is obvious that femininity only confers protection to modest degree even in Caucasian women; it increases the risk for Negro women in Atlanta. Th data supplied by the pathologists lend little support to the idea that suppression of androgen and high levels of estrogens will prevent progres of coronary sclerosis.

Early Development of Disease

The evidence from Minnesota that coronary disease makes great progress in the first two decade of life confirms the findings from studies of American soldiers killed in Korea.[13] Half of the American (average age 22 years) had atherosclerotic plaque in the coronary arteries, and 10% had the lume of one major branch reduced by more than 50% Enemy soldiers and young Japanese men had n *lipid deposits and no atherosclerosis.* It is to b emphasized that these Orientals were vigorou young men who fought well, and their arterie showed the intimal supports normal to all huma beings, with smooth muscle in abundant groun substance. They had survived two decades of wa and revolution and had been under stress far mor than the Americans. They had been accustome to long hours of physical labor but had had n milk products after infancy, little animal fat, an few eggs in their diets. This report, like so man others comparing poor Europeans, Orientals, Africans, or Latin Americans with prosperous North Americans, strongly suggests that men's arteries become sclerotic only when the diet would produce this lesion in a high percentage of men or women, chickens, rabbits, or monkeys. Sex difference in intimal structure or endocrine effects on lipid metabolism may explain in part why Caucasian women in North America have fatal coronary lesions 10 to 18 years after men. On the other hand, men, with higher metabolic rates, consume much more fat than women, and at puberty far more females than males restrict their diets. The period of high androgen levels and of rapid lipid infiltration of coronary intima coincides with a period when boys and young men have insatiable appetites for fatty food. Blood cholesterol levels are lower than later in life at this time of rapid atheroma formation.

Role of Diet

That the high rate of atherogenesis in adolescent boys and young men may be due largely to diet is suggested by the findings of Young and Pilcher[14] in a careful dietary survey in upstate New York in 1948 (fig. 2). There was almost no rise in the intake of calories, protein, and vitamin A by girls and women between 8 and 30 years of age. These findings disturbed the Cornell University investigators, for they show that, in spite of growth and weight gain, these girls and women held their food intake to levels which, in many, were below those regarded as minimal for good health.

On the other hand, in the males, the intake of calories, protein, and vitamin A rose sharply during adolescence. Vitamin A consumption, a good index of intake of egg yolk and butter fat, doubled between 7 and 15 years, falling rapidly between 15 and 20 and slowly thereafter to a level 25% above that in childhood. The rise in calories in adolescent boys was 40% and in protein 65%, with much less marked decline after maturity than that for vitamin A. While these sex differences in food consumption are undoubtedly dependent on androgen and estrogen, they show that the effect on diet may be more important than on lipid metabolism per se. This sex difference in diet was confirmed for Iowa adolescents by Eppright and Swanson in 1955.[15]

In man, there is rather striking evidence[16] that abuse of alcohol may cause hyperlipemia, thus hastening atherosclerosis and hypercoagulability, just as do diets rich in fat. Abuse of tobacco also appears to accelerate the fatal evolution of atheromas.[17] We have no information on the relative stresses or responses to stress in men and women, but there is no doubt that men still use alcohol and tobacco to excess far more than do women. Thus, the sex difference in age at death from coronary sclerosis may be due as much to external influences as to the differences in coronary intima or to the action of androgens on lipid metabolism or coagulation. This conclusion is in accordance with the fact that in 1772 Heberden's 100 patients with angina included 3 women, in 1896 Osler's series of 40 included only 1, and in 1957 Plotz' compilation of over 2,100 showed a ratio of 4 women to 17 men. If habits of either sex, rather than sex itself, were the decisive factor, the sex ratio would change as habits changed, with time, locality, or race.

Comment

What practical consequences can be drawn from this recent evidence of the relation of sex and other factors to early death from coronary disease? If, as one could have speculated five years ago, masculine vulnerability was due solely to inherent anatomic difference in the coronary intima or to the effect of the steroids which are essential for normal life, the prospects of doing anything would be hopeless. On the other hand, if these inherent factors merely accentuate the effects of exogenous influences which are essential to evoke any lesion, or are more potent than sex in accelerating its progress, the physician must do what he can to lay the facts before those who have, or have a high risk of developing, coronary disease. No one can be optimistic about easy success in persuading the obese patient to eat less, the patient with cirrhosis to drink less, or the patient with coronary disease to modify his usual way of eating, drinking, and smoking. Yet for those men who have heavy responsibilities and have had the intimation of swift mortality associated with heart disease it is not so difficult to make radical changes in their way of life. They often find it possible to adopt a regimen which does not interfere with work, play, or sexual activity and involves no outlay of money for drugs or laboratory tests. By

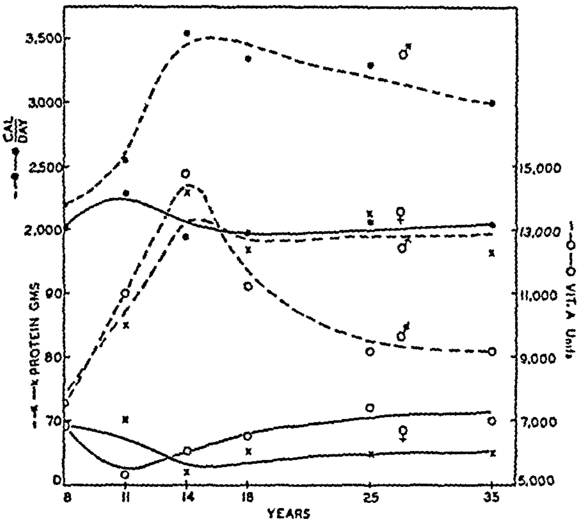

Fig. 2.—Daily food intake of adolescents (data from Young and Pilcher[14]).

merely avoiding eggs, milk products, and the visible fat on meat they avoid the diet associated with high rates of coronary disease. Fifty-two years ago Osler told his students that in treatment of many cases of coronary disease diet was the "central point." This has been amply borne out by recent research. Fourteen years later he reported that the largest contingent of his patients with angina were men "leading lives of high tension, who eat, drink, and smoke to excess." Perhaps this is still the best clue for those who seek to answer the question, "Why are men's coronary arteries so sclerotic?"

Conclusions

The coronary arteries lying in the epicardium have intimal supports of longitudinal muscle lying in a matrix of connective tissue. These structures, most evident near the branchings of the vessels, adapt them to the change in length in systole and diastole. They vary from person to person but are more developed in males than in females, even at birth. They probably explain the predilection of atherosclerosis for these vessels, since lipid accumulates in them, and they provide an anatomic basis for earlier lesions in males.

Androgens modify the plasma lipid pattern and perhaps also affect clearing factor and blood coagulability, thus aggravating the risk of coronary sclerosis and thrombosis in males.

The sex incidence of coronary disease, however, has markedly changed in the past 50 years; the incidence in Caucasian women has risen from 3 to nearly 20%, and in Negroes in Atlanta, Ga., deaths from coronary disease occur in women earlier in life than in men. This suggests that differences in eating, drinking, and smoking may be major factors in the sex difference in coronary disease. A great difference in eating habits of girls and boys at adolescence, when the masculine rate of atheroma formation is maximal, has been reported by dieticians. The high death rate from coronary disease in Caucasian men, at ages up to 60 years, can be accounted for entirely by the much higher rate of infiltration observed in males from birth to the age of 30. After that time, the rate of deposition of lipid in the intima is as fast in women as in men, but it takes 12 years to overcome the higher incidence gained by males during childhood and adolescence. Stress may precipitate coronary attacks and probably accelerates lipid deposition and coagulation of blood, but in those persons on diets low in animal fats stress does not cause atherosclerosis.

The fault lies not in sex but in the masculine love for rich food, alcohol, and tobacco that in our civilization men die chiefly from coronary disease. As Osler pointed out half a century ago, this is the "nemesis through which Nature exacts retributive justice for the transgression of her laws."

450 Clarkson Ave. (3).

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EFFECT OF ISONIAZID IN ANGINA PECTORIS

Elmer Pader, M.D.
and
Hyman Levy, M.D., New York

Isoniazid was administered over periods of three weeks to 20 patients who had been known to have angina pectoris for at least a year. The dosage was 300 mg. a day in three divided doses of 100 mg. each. The patients were instructed to continue taking nitroglycerin as needed, but all other coronary vasodilators were withdrawn. Ten patients completed the three-week course without decreased anginal pain or increased capacity for effort. Eight others did not complete the course, either because of disabling side-effects or because they saw no improvement. Only two patients felt better, and only one of these noted any return to his pretreatment state when he stopped taking the isoniazid. The dosage used in this series of patients, while sufficient to cause disturbing side-effects, appeared to have little value in the treatment of the anginal syndrome.

The recent reports[1] of the striking relief of anginal pain by iproniazid (1-isonicotinoyl-2-isopropylhydrazine phosphate) (Marsilid) have stimulated interest in the possible use of its less toxic analogue, isoniazid (isonicotinic acid hydrazide), for this purpose. A single report[1d] has described significant improvement in the anginal syndrome in one-third of patients treated with isoniazid. The purpose of the present study is to further evaluate the effect of isoniazid in angina pectoris.

Materials and Methods

The clinical material used in this study comprised 20 patients from an office practice devoted largely to cardiac disease. All of the patients had been known for at least one year, and in most of the patients angina pectoris due to coronary artery sclerosis had been present from 1 to 10 years. The diagnosis was established by the typical history of chest pain on effort. In all patients, the anginal syndrome was stable at the time of the study. Patients in whom serial electrocardiograms or history suggested acute coronary insufficiency or impending myocardial infarction were excluded. The patients ranged in age between 53 and 78 years, with 17 between the ages of 60 and 72. There were 15 males and 5 females, approximating the usual ratio of males to females with coronary artery disease in this age group. Three had significant hypertension and 17 were normotensive. Diabetes mellitus was present in two. Eight of the patients had sustained at least one previous myocardial infarction. Nitroglycerin requirement varied from occasional use to use as frequently as 35 times a day. The resting electrocardiogram taken prior to isoniazid therapy was abnormal in 13 patients, revealing evidence of previous myocardial infarction or of T-wave and S-T-segment deviations without evidence of previous infarction. A normal resting electrocardiogram was present in the remaining seven patients in whom the diagnosis was established by the classic history alone.

Isoniazid was administered in a dosage of 300 mg. a day in three divided doses of 100 mg. each for a period of three weeks. The patients were instructed to continue taking nitroglycerin as needed, but all other coronary vasodilators were withdrawn. Digitalis, diuretics, and other measures to control congestive heart failure were continued as indicated. On receiving the isoniazid, the patient was informed only that it was a drug found useful in some patients with angina, whereas it was not found beneficial in other such patients.

Evaluation of the effect of isoniazid was based purely on the subjective response of the patient with respect to change in the capacity for effort and the frequency of anginal attacks. If, by these criteria, improvement was noted at the completion of the three-week course of isoniazid, the drug therapy was continued for an additional three weeks. If improvement was sustained for six weeks, the drug therapy was then stopped to determine the effect of its withdrawal.

Results

Ten of the 20 patients completed the three-week course of isoniazid therapy but observed no improvement whatsoever in their anginal pain or capacity for effort. Four additional patients also found the drug to be ineffective but were com-

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From the Department of Medicine, Mount Sinai Hospital.

pelled to stop the medication after only one to two weeks because of the occurrence of disturbing side-effects. One patient developed intensification of pain two days after starting isoniazid therapy and was found to have sustained a fresh myocardial infarction by electrocardiogram and clinical course. One patient noted no improvement in his anginal pattern after two weeks of isoniazid therapy and stopped taking the drug. Two patients noted slight improvement in anginal pain and slightly increased capacity for effort but were compelled to stop taking the drug because of unpleasant side-effects. One patient noted partial improvement in his anginal syndrome after three weeks of isoniazid therapy and the therapy was continued for an additional three weeks, during which the improvement was maintained. However, on discontinuation of the drug, he failed to notice any return to his pretreatment state. This is in marked contrast to the reported experience with iproniazid in which improvement persisted only as long as the therapy was continued, with recurrence of symptoms within days after discontinuing it. One must therefore consider the result in this patient equivocal at best. A single patient noted diminished frequency of pain and slightly increased capacity for effort which was maintained through six weeks of isoniazid therapy and which reverted to the pretreatment state when the therapy was stopped.

Side-effects.—Side-effects were observed in four patients (20%). Diarrhea occurred in two patients and nausea in two; one patient each developed dizziness, pyrosis, and generalized pruritus. The effect of isoniazid on the blood pressure was not impressive as compared to the reported effect of iproniazid in this respect. In seven patients a fall in the systolic pressure occurred; in four it was minor (10 to 20 mm. Hg) and in three moderate (over 20 mm. Hg). A minor fall in the diastolic pressure was noted in four patients (10 to 15 mm. Hg), but in none was there a marked fall. Neither syncope nor faintness while standing, suggestive of orthostatic hypotension, was encountered. Other side-effects, observed in patients receiving iproniazid, such as nervousness, impotence, paresthesias, difficulty with micturition, or evidence of hepatic dysfunction, were not observed in this series.

Effect on Electrocardiogram.—After the use of isoniazid, the resting electrocardiogram remained unchanged in 16 patients. In three patients minor T-wave changes, unassociated with S-T-segment deviations, were noted. The remaining patient developed the electrocardiographic pattern of acute anteroseptal myocardial infarction two days after starting isoniazid therapy. The causal relationship of the drug to this event cannot be ascertained.

Comment

Since the first published reports by Cesarman[2] and by Cossio[3] on the dramatic effect of iproniazid on anginal pain, other investigators[4] have confirmed their findings. Cesarman reported excellent results in all of 72 patients receiving iproniazid, and Cossio reported complete or almost complete remission in one-third of 120 patients and reduction in frequency, duration, and intensity of pain in another one-third. In Master's[1e] series of 74 patients 13 were completely relieved of angina, and in 28 patients angina was almost completely relieved. Towers and Wood[1f] described dramatic improvement in 17 of 40 patients treated with iproniazid and significant improvement in an additional 14.

Reports dealing with the use of isoniazid in angina pectoris are less numerous and the results less impressive. Cossio[1d] reported that one-sixth of 35 patients obtained complete or almost complete relief from isoniazid and significant improvement occurred in an additional one-sixth. Substitution of isoniazid for iproniazid provoked a recurrence of anginal pain in one-half of his patients, although he states that the pain was occasionally less frequent and less severe. Where isoniazid proved ineffectual in relieving anginal pain, the substitution of iproniazid for isoniazid resulted in subsidence of pain in one-half of these patients. In the study of Towers and Wood[1f] isoniazid was substituted for iproniazid in one patient and found to be ineffective. In the present series of 20 patients, using the same dosage of isoniazid as Cossio did (300 mg. daily), we found the drug to produce a significant, sustained improvement in a single patient only. An additional two patients who reported slight improvement were compelled to stop using the drug because of the occurrence of unpleasant side-effects. On the basis of this small series we concluded that isoniazid has little value in the treatment of angina pectoris.

The mechanism of action of iproniazid and isoniazid on the anginal syndrome is not as yet clear. Most investigators[5] feel that these drugs have no effect on the fundamental causes or natural history of coronary artery disease. Cesarman,[2] however, noting a correlation between subjective improvement on iproniazid and electrocardiographic improvement in many patients, believes that iproniazid has a direct action as well as a symptomatic one on the pathogenesis of angina pectoris.

Among the possible mechanisms of action proposed are (1) central nervous system stimulation with general elevation of mood and increase in the pain threshold [1e]; (2) a selective analgesic action on pain of ischemic origin, perhaps by selective block of the pain-producing "P substance" of Lewis [3]; (3) inhibition of monoamine oxidase causing an increased amount of catecholamines in the myocardium as well as an accumulation of serotonin in the brain, the latter resulting in central nervous system stimulation [6]; (4) inhibition of other enzymes involved in oxidative processes which either save oxygen or increase its utilization [1b]; and (5) increase in coronary flow, which has been demonstrated in vitro in the isolated, perfused cat and guinea pig heart.[6a]

In attempting to explain the relative ineffectiveness of isoniazid in angina pectoris by comparison with iproniazid, these differences in characteristics may be significant: Isoniazid produces much less central nervous system stimulation, elevation of mood, and euphoria than does iproniazid. Isoniazid is a relatively weak inhibitor of monoamine oxidase, producing a less marked rise in myocardial catecholamines than does iproniazid. Finally, using the perfused cat heart, Pletscher and Pellmont [6a] have demonstrated that *isoniazid definitely* has a lesser effect on coronary flow than iproniazid.

Side-effects

The occurrence of frequent and severe toxic effects due to iproniazid has tempered the earlier enthusiasm about the value of this drug in angina pectoris and prompted the evaluation of the less toxic isoniazid. In iproniazid-treated patients, hypotension, particularly in the *standing position*, has been noted frequently. Syncope with death,[1d] cerebral thrombosis,[7] *coronary artery occlusion*,[5] and coronary insufficiency with subendocardial necrosis [1e] have been observed. Faintness, weakness, and brief syncopal episodes have been described. Toxic hepatitis due to iproniazid, with jaundice, extensive hepatocellular necrosis, and sometimes death, is being reported with disturbing frequency.[8] Our own series shows that isoniazid, by comparison, is a significantly less toxic drug than iproniazid, and this confirms earlier findings.[9]

The effects of isoniazid on blood pressure were relatively insignificant and the deleterious effects due to a marked fall in blood pressure were therefore not observed. The side-effects encountered, although not serious, were sufficiently disturbing to limit the use even of isoniazid.

Summary and Conclusions

The effect of isoniazid in angina pectoris has been studied in 20 patients. In 16 patients (80%), isoniazid had no effect on the anginal syndrome; in 2 patients (10%) slight improvement in the capacity for effort was noted, but side-effects compelled discontinuation of the drug; in one patient (5%) an equivocal result was obtained; and in only one patient (5%) was sustained improvement noted while he was receiving isoniazid. The effect of isoniazid in relieving anginal pain is considerably less than the remarkable results reported for iproniazid. There are several possible explanations for this difference in effect. The side-effects of isoniazid are less frequent and considerably less serious than those reported for iproniazid. Isoniazid appears to be of little value in the treatment of the anginal syndrome.

1185 Park Ave. (28) (Dr. Pader).

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INFLUENCE OF AIR CONDITIONING ON HOSPITALIZED PATIENTS

George E. Burch, M.D.
and
Nicholas DePasquale, M.D., New Orleans

A comparative study of circulatory and respiratory functions was carried out in 163 female hospital patients, 88 of them being in an air-conditioned ward while 75 were in a warm and humid ward affected by the outside weather. The numerical data were supplemented by systematic notes on appearance and behavior of the patients. Although the average age of the patients in the air-conditioned ward was five years greater, their mean systolic blood pressure was lower, pulse rate slower, and oral temperatures lower than those of the patients in the non-air-conditioned ward. Three cases are described in detail to show that in some situations the transfer from the warm, humid ward to the air-conditioned ward was decisive in bringing about the patient's recovery. A fourth case exemplifies the occasional unfavorable response to the change; there were nine instances of this. The possibility that the patient might benefit from an air-conditioned environment should be kept in mind, especially in cases of heart disease.

During the tropical New Orleans summers of 1957 and 1958, cardiac output and manifest work of the right and left ventricles were measured in a warm and humid ward and in a cool air-conditioned ward.[1] The cardiac output was greater in every patient in the warm and humid ward, the mean being 51% and the range 21 to 144%. In most instances the manifest work of one or both ventricles was also increased. The failure of manifested work to increase in some cases was due to an associated decline in pulmonary and/or systemic blood pressure. To obtain more general clinical information, including such less objective factors as comforts and psychological states, each patient was observed at the bedside and carefully questioned daily. This report presents the results of this study and emphasizes the benefits of air conditioning the environment of the ill or debilitated patient.

Material and Methods

All the patients were adult Negro females who were admitted on a rotational basis to adjacent air-conditioned or non-air-conditioned wards at the Charity Hospital, New Orleans. These studies were carried out from July 1 to Aug. 15 at the height of the tropical summer weather of 1957 and 1958. A total of 88 patients were studied on the air-conditioned ward and 75 patients on the open warm and humid ward exposed to the outside weather. The patients were seen twice daily, at 8 a. m. and 4 p. m. Blood pressure, pulse rate, respiration rate, and body temperature were recorded. General appearance was observed, with special attention to restlessness, irritability, sweating, and general well-being. The routinely recorded notes of the nurses, medical students, and various attending physicians were studied. Comments volunteered by the patients, observations of other clinicians, and comments from the nursing staff were also noted. The ward temperature and relative humidity were recorded daily at 8 a. m. and 4 p. m. with a sling psychrometer.

Results

Mean blood pressure, body temperature, pulse, and respiratory data are summarized in the table.

Air conditioning the environment of the hospitalized patient was found to be favorable in 71 patients, unfavorable in 9, and indifferent in 8. Favorable response was particularly evident in patients with congestive or coronary heart failure, bronchial asthma, and chronic diseases with debilitation. The following cases illustrate benefits of air conditioning.

Report of Cases

Case 1.—A 46-year-old female was admitted to the hospital on July 3, 1958, because of congestive heart failure associated with orthopnea, cyanosis, and anasarca, including edema of the face and arms. The patient had previously had cardiac catheterization studies and was found to have a bidirectional shunt through an atrial septal defect. She was admitted to the warm ward in a moribund state, too orthopneic to lie back even a few degrees and two dyspneic to talk. The blood pressure was 100/80 mm. Hg, pulse rate 110 per minute, respiration rate 28 per minute, and temperature 98.4 F (36.9 C).

The usual measures for the treatment of congestive heart failure were used, including phlebotomy, with only slight improvement. The patient remained restless, sweated profusely, complained of discomfort from the heat, and had continued tachy-

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From the Department of Medicine, Tulane Medical School, and Charity Hospital of Louisiana.

cardia. On the third hospital day it was decided to transfer her to the air-conditioned ward. The improvement in the patient's condition within 24 hours was most impressive. This improvement continued; three days later she was able to lie almost horizontal, and within a week she was able to walk around the ward. Her pulse rate had slowed to 76 per minute, the venous pressure was 160 mm. H_2O, she lost 28 lb. (12.7 kg.), but the cyanosis was unaltered.

Comment.—For the three days that this patient remained on the warm and humid ward there was no improvement in her health. She was always drenched with perspiration, was extremely dyspneic and restless, and was apparently suffering from the heat. On transfer to the air-conditioned ward, the discomfort from the heat disappeared and sweating ceased. She felt better, was more comfortable, and was able to relax. There was a gradual and steady improvement in her health so that within one week she was able to walk with minimal difficulty. As was found in previous studies,[1] the cool and comfortable air-conditioned environment reduced the demands on her myocardium, thus reducing cardiac output and cardiac work so that her heart rested sufficiently to permit compensation.

Mean Clinical Data Obtained in Air-Conditioned and Non-Air-Conditioned Wards

Ward	Patients, No.	Determinations, No.	Mean Age, Yr.	Mean Blood Pressure, Mm. Hg	Mean Pulse Rate/Min.	Mean Respiratory Rate/Min.	Mean Temperature, F	Ward Temperature, F Day Mean	Ward Temperature, F Day Range	Ward Temperature, F Night Mean	Ward Temperature, F Night Range	Mean Relative Humidity, %
Air-conditioned	68	7,680	48	130/77	83.5	21.5	98.4	76	(71-76)	75	(72-76)	65.7
Non-air-conditioned	75	6,444	43	135/76	89.5	21.5	98.7	87	(90-79)	84	(80-88)	83.8

CASE 2.—A 25-year-old female was admitted to the hospital on July 31, 1958, because of status asthmaticus. The patient had been treated for approximately eight hours in the emergency room for severe bronchial asthma. Because of failure to respond to therapy and apparent suffering from the heat with marked sweating, restlessness, and irritability, she was admitted to the air-conditioned ward with the hope that she would benefit from the comfortable environment. The blood pressure was 110/80 mm. Hg, pulse rate 122 per minute, and temperature 100.8 F (38.2 C).

The patient was extremely tense and agitated. She was acutely dyspneic, and both lung fields contained wheezes and coarse rales. The patient arrived on the ward at 11 p. m. without alterations in therapy. She was asleep within two hours, and by morning she was no longer dyspneic, although a few rales remained in both lung fields. She stated that while in the warm and humid emergency room she felt "as if the walls were closing in around her," while on the cool ward breathing was easier and she was able to relax.

Comment.—Several factors probably influenced the improvement made by this patient when she was admitted to the air-conditioned ward. The calmness, thermal comfort, and quietness of the ward must have been conducive to psychological and physical relaxation, which decreased the demands for oxygen and breathing. The low humidity, as well as the lessening of allergens due to filters in the air ducts, may have removed the source of her difficulty. The benefits of the air-conditioned ward were dramatically displayed.

CASE 3.—A 38-year-old female was admitted to the air-conditioned ward on July 22, 1958, because of chronic renal disease, congestive heart failure, and mild uremia. Several years earlier she had had a nonfunctioning kidney removed, in an attempt to relieve her hypertension, without benefit. For several weeks prior to admission the patient noticed progressive dyspnea, swelling of the ankles, nausea, and vomiting. She was receiving 100 mg. of digitalis leaf daily. Blood pressure was 190/120 mm. Hg, pulse rate 102 per minute, respiration rate 38 per minute, and temperature 97.6 F (36.4 C).

The patient appeared to be a thin, chronically ill female who was in acute respiratory distress. Fine rales were present throughout the bases of both lung fields, and a loud harsh systolic murmur was audible at the apex. The heart was large, and venous pressure was 300 mm. H_2O. Digitalis therapy was continued, a mercurial diuretic was administered, and restriction of salt intake was begun. Within several days the patient was much improved. The venous pressure had declined to 120 mm. H_2O. The blood urea nitrogen level decreased from 68 mg. % on admission to 40 mg. % and remained at about this level for the remainder of her hospital stay. The nausea and vomiting gradually subsided, and the patient's appetite improved. She remained in hospital for one month, during which time she improved in health and gained in strength. No attempt was made to reduce her blood pressure at this time.

Comment.—This patient always appeared to be chronically ill and debilitated. She stated that her present difficulties began with the onset of the warm summer weather, when she began to feel uncomfortable, perspired a great deal, and became anorexic. She could no longer lie in bed and would sit in a chair all night near an open window fanning herself "for breath." After the first few days of treatment on the air-conditioned ward she no longer had such difficulties. She rested and slept well at night and on many occasions remarked that the coolness of the ward was responsible for her improvement and apparent well-being. A patient with little cardiac or renal reserve could develop failure of both of these organ systems under the stresses imposed by a hot and humid environment and improve when the environment stress is removed.

Unfavorable Response

While most patients were more comfortable and experienced improvement in their clinical course in the cool environment, this was not always true. An occasional patient complained that she "felt as if she had a cold." A few patients in congestive heart failure seemed to benefit from the cardiac rest afforded by the cool atmosphere in terms of a slower pulse and less dyspnea but complained of discomfort from the coolness of the ward and the inability "to get warm." Some patients were comfortable during the day but were too cool at night. Since it is not possible to regulate the environmental temperature and humidity to satisfy the differences in needs for comfort among patients, this was usually solved by providing blankets or sheets for covering. Nevertheless, an occasional patient did not tolerate the air-conditioned environment well.

Case 4.—A 31-year-old female was admitted to the hospital on July 1, 1958, for diagnostic studies because of a chronic pericardial effusion. The patient's symptoms consisted of mild shortness of breath and precordial pain. Venous pressure was 130 mm. H_2O, and the S-T segments were elevated in V_4, V_5, and V_6. Blood pressure was 120/85 mm. Hg, pulse rate 88 per minute, respiration rate 21 per minute, and temperature 99.2 F (37.4 C).

The patient complained of inability to keep warm and of a constant "stuffiness in her nose." Later she said that she had "caught cold" because of the air conditioning. She slept in a non-air-conditioned warm ward at night and sat in a non-air-conditioned solarium during a large part of the day. Her symptoms did not improve during the hospital stay.

Comment.—This type of reaction to an air-conditioned environment was unusual in the patients observed (only nine had an unfavorable response). It is perhaps surprising that more patients did not behave similarly, since the patients studied were indigenous to this area and acclimatization to the tropical weather was expected. However, in previous studies [1] no subject failed to demonstrate an increase in cardiac output when in a hot and humid environment, so that total acclimatization, at least in terms of cardiac output, must be the exception rather than the rule.

Comment

From the medical standpoint, a cool air-conditioned environment was beneficial to the invalid in large part because he slept more soundly, longer, and more restfully. The dyspneic patients found it easier to breathe, thus relieving anxiety and apprehension. Sweating with associated loss of fluid and electrolytes was eliminated as a clinical problem. The patients rested in bed more satisfactorily and were more coöperative and calm and less restless than on the warm ward. The management of atopic patients was improved probably in part because allergens were filtered out of the environment.

The elimination of sweating is an important factor in the management of the patient with congestive heart failure, for when it becomes necessary to maintain thermal equilibrium by sweating the cardiovascular system has been shown to be more actively at work.[2] Previous studies done at the Charity Hospital on 16 patients with congestive heart failure showed that severe dyspnea, rales, and gallop rhythm developed in all but 4 of these patients when they were exposed to a hot and humid environment (104 F and 85% relative humidity).[3]

Nursing was made easier by the cooler atmosphere of the air-conditioned ward. The suppression of perspiration produced comfort to the patients, nurses, maids, and all attendants and reduced objectionable odors. The quietness induced by the ward being closed was conducive to rest and relaxation. Linen remained clean longer and did not wrinkle readily, tending to prevent and improve the management of decubitus ulcers. The attitude of all personnel in contact with the patients was better; the general morale of all people in the ward was improved. The quiet, calm, and relatively peaceful nature of the air-conditioned ward increased the work efficiency of all those concerned with patient care.

The lack of statistical significance between the differences in blood pressure, pulse, and respiration of the patients on the two wards indicates the unreliability of these parameters in assessing the more subtle effects of air conditioning on the patient. Even in patients whose cardiac output was measured and found to increase, the pulse and respiratory rates did not change significantly.[1] In some patients one or both even increased in the cool environment. However, in individual patients the changes in vital signs noted for the cool and warm and humid environments were fairly large. This was particularly true in patients with heart disease (case 1). Therefore, it is necessary to individualize the influence of air conditioning for each person.

There were great contrasts between the two wards. For example, on the cool ward at 7 a. m. most patients were still asleep. They slept frequently during the day, and there was a general appearance of calm and quiet with outside noises reduced or eliminated. At the same time, on the warm ward at 7 a. m., most patients were sitting near their beds or walking around. Their skins appeared greasy and sweaty. Many had spent a restless night, sleeping for only short periods. Some complained that they were cooler and more comfortable at home.

The bed linen of many patients was damp with perspiration. On days when the temperature ranged between 80 F and 82 F and the relative humidity remained below 65%, most patients were fairly comfortable. However, during July and August in New Orleans such moderate temperature and relative humidity were rare.

Summary

At the Charity Hospital, New Orleans, 88 patients were studied on the air-conditioned ward and 75 patients on the open warm and humid ward exposed to the outside summer weather. Some of the less objective benefits of air conditioning the environment of the sick room, from both the medical and nursing points of view, were that air conditioning eliminated sweating, fostered a calm and quiet atmosphere, improved morale of both patients and attending personnel, removed allergens from the environment, and increased the tolerance of enforced bed rest. Most patients were greatly benefited by air conditioning, but the therapeutic results were not dramatic in all patients. There was a wide range of response of the patients, with the majority deriving benefit from the cool environment and only a few manifesting an unfavorable response. Air conditioning the environment of the sick room of a debilitated and chronically ill patient was found to be a useful adjunct to therapy which has not received the emphasis in medical literature that it deserves. This was particularly important for the patient with heart disease.

1430 Tulane Ave. (12) (Dr. Burch).

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HEADACHES IN THE ANTARCTIC

Capt. Charles S. Mullin Jr. (MC), U. S. Navy

Headache is a frequent complaint at isolated antarctic bases. It was blamed in 50% of 37 sick call entries in this study. The medical officer found that few if any headaches could be attributed to eye strain, the cold, poor ventilation, sinus trouble, constipation, or similar factors. Interrogation indicated that headache was apparently related to the sharply felt need for careful control of aggression under circumstances of enforced close personal association. The headaches occurred more frequently in the civilian and officer group than in the enlisted group.

During two tours of American Antarctic International Geophysical Year installations in 1957-1958 in connection with a study of the adaptation of personnel to polar conditions, there was a seeming frequency of complaints of headache. Although headaches seemed common at most stations, one small base was selected for a close look at the problem. This isolated station was staffed by 12 civilian scientists and 12 military support personnel. Group morale was high. Some observations relative to the headache problem follow.

The sick bay log revealed only 37 entries for any cause during the 10-month period from the date on which the group became located there to the date of my visit. Of the 37 entries for any cause, 19 (50%) were for headaches described by the station medical officer as "severe." Eight men, one-fourth of the station complement, accounted for these 19 entries. Six of the eight were civilian scientists, that is, half of the civilian complement. The medical officer stated that entries were made for headaches only when the symptom was severe enough for him to suggest that the sufferer take time off from his duties and rest. He further stated that these headache entries represented only a fraction of the total number of headache complaints of personnel who made informal nonrecorded visits to sick bay for aspirin or other analgesics.

All the sufferers from severe headache had indicated that their headaches were in varying degrees more frequent and severe during their stay in the antarctic than before. Of the eight major sufferers, three said that they had had fairly frequent and sometimes severe headaches prior to their antarctic experience, and the others said that they had rarely experienced headaches.

There was insufficient time to obtain a detailed description of these headaches, but they appeared to present "vascular" and scalp muscle tension manifestations, with one man experiencing typical migraine. Cold was not a factor related to these headaches at this station (or others). Most of the headaches occurred during the winter months when there is comparatively little outside activity; in fact, most of the headaches were initiated and continued indoors. About one-third observed some relationship between their emotional state and occurrence or aggravation of headaches. The others were not aware of any such relationship and either could offer no explanation for their occurrence or gave explanations varying from general fatigue to eye strain, sinus trouble, and insomnia.

The station medical officer felt that few if any of these headaches could be attributed primarily to eye strain, poor ventilation, fatigue, cold, hunger, sinus trouble, constipation, or similar factors. The medical officer, who was also officer in charge of the station, said that all carbon monoxide detection devices were in order throughout the year and that he saw no reason to believe that low-grade carbon monoxide intoxication could have been a factor.

In addition to the more detailed investigation made at this station, the following observation was made at another isolated station the year before. At that station, of the 9 civilians and 4 officers attached, 6 complained of fairly frequent headaches, while of the 21 enlisted men whose records were available for review, only 3 complained of the symptom to the degree warranting an entry in the sick bay log.

Comment

These observations indicate a general frequency of headache at some stations in the antarctic, especially at the more isolated bases, and a tendency for this symptom to occur more prominently in the officer-civilian group. Psychological factors are probably important. A relationship often exists between controlled (repressed and suppressed) anger and the occurrence of this symptom. It is a striking fact, also, that at these small stations there was a remarkable absence of either physical fights or hostile-angry arguments. At the station on which this report is largely based, not one instance of fisticuffs occurred during the 10-month period and violent angry arguments were extremely rare.

When it is considered that the base comprised a group of young men of widely diverse background and interests, thrown together in enforced close personal association for a period of almost a year, the absence of such overt expression of hostility may seem astonishing. But a closer examination of the situation reveals the logic of this apparent tranquility. There was a conscious recognition of the necessity of control and of avoiding open breaks. Each man recognized that he was dependent on the goodwill of the "next man" and of the group as a whole in this "tight little world" for his own vital feelings of acceptance, security, and worth and that overtly expressed antagonisms represented too much risk when other sources of gratification of these needs were not available for an entire year. This abnormal control effort, whether it took the form of suppression, repression, distanciation, intellectualizing, philosophizing, or what not, could not be achieved without some cost in terms of accumulated tension.

The enlisted group were perhaps more fortunate in having more varied methods of handling the problem. For example, there was violent swearing (without, however, as much emotion as the content of their polemic would seem to call for), vigorous horseplay, loud but essentially good-natured complaining, and an interesting technique of exchanging frank and fearful insult, often quite personal and to the point but apparently rarely reacted to with much if any anger, as if there were a tacit mutual recognition of the function of the exchange. The more sophisticated scientist-officer group were more limited in the effective techniques available and were perhaps under greater self-imposed necessity for careful control of their aggressions: hence their preponderance of headaches.

Summary

Headaches are a frequent complaint at isolated antarctic bases and appear related to the sharply realized necessity for careful control of aggression under circumstances of enforced close personal association for a period of a year. These headaches occurred more frequently among the more sophisticated civilian and officer group, probably because of self-imposed higher level of restraint, as well as their inability to utilize certain techniques for dissipating their aggressions which were available to the enlisted group.

U. S. Naval Hospital, Philadelphia (45).

Lieut. Peter P. Ruseski, M. C., U. S. Navy, medical officer of the station studied, provided the information on which this report is based.

FUNCTION OF A METROPOLITAN CYTOLOGY LABORATORY

Douglas P. Graf, M.D., Cincinnati

Examination of cervical and vaginal smears for cytologic evidence of cancer has become frequent since its introduction in 1943. The number of examinations done in a single laboratory increased from 5,957 in 1950 to 27,602 in 1957. Follow-up studies have been possible on 1,044 women from whom vaginal smears were obtained in 1950. Experience has led to improved techniques and more reliable criteria for interpreting results. In one series the number of false-positives, judged by subsequent tissue studies, was 3.5% and the false-negatives 7%. Comparison of cytological results with other clinical and laboratory data has also been possible in 27,602 cases in a recent 12-month period; in this series a doubtful or positive smear led to the diagnosis of unsuspected uterine cancer in 77 cases. It is believed that the value of large-scale cytological screening of women by this technique is well demonstrated by the results here reported.

The publications of Papanicolaou,[1] Papanicolaou and Traut,[2] and Meigs and others[3] in the early and middle 1940's produced national interest in exfoliative cytology as an aid to the early diagnosis of cancer, particularly uterine cancer.

As a local manifestation of this interest a cytology laboratory was instituted at the Cincinnati General Hospital in 1947. Its sphere of activity was limited to patients of the Cincinnati General Hospital, and its personnel consisted of one house officer. After two years it was felt that the work of the laboratory was sufficiently promising to warrant extending its facilities to the practicing physicians of the community. Subsequent growth may be estimated from the steadily increasing volume of work.

For example, in 1950 there were 5,957 cervical and vaginal smears performed by the laboratory; in 1951, 7,789; in 1952, 9,268; in 1953, 12,730; in 1954, 12,499; in 1955, 14,259; in 1956, 20,822; and by 1957, 27,602. The purpose of this paper is to consider briefly the mechanics involved in the operation of such a laboratory, some of the problems encountered, and some of the results obtained.

Operation

At the present time the laboratory personnel consists of a physician, who serves as director and reviewing cytologist, and three technicians, whose duties include the staining and mounting of smears, the screening of these smears, and the large amount of secretarial work incidental to the function of the laboratory. We feel that this is the minimum number of technicians needed to handle the current work load and that a fourth technician will be necessary in the near future.

Interested physicians obtain mimeographed instruction sheets and request forms for cytological examination from the laboratory (see figure).

Equipment for taking the smears and fixative are supplied by the individual physician. The routine use of ground-glass "write-on" slides reduces identification difficulties and significantly lessens the time required to process smears. No direct recommendations are made as to the type or number of smears done on the individual patient. The trend, however, has been to the use of the Ayre spatula[4] in place of the bulb and pipet. This, too, has been helpful in expediting the work of the laboratory. Diagnosis in the case of a vaginal smear (made with bulb and pipet) may depend on only one or two cells. When abnormal cells are present in the cervical smear (made with the Ayre spatula), they are almost always present in abundance. It is argued that vaginal smears screen more potential cancer sites. As counter-argument it may be pointed out that while epidermoid carcinoma of the cervix uteri is a common lesion, adenocarcinoma of the cervix is uncommon, corpus carcinoma is very uncommon outside of specific age groups, and diagnosis of tubal or ovarian cancer by smear is rare. If the physician is particularly interested in screening these latter areas, an endocervical or caval aspiration may be used.

Smears are fixed in the physician's office for at least one-half hour and are then permitted to dry. Smears would be of better quality if kept wet from the time of fixation until staining; however, the practical advantages of drying, insofar as transportation and processing are concerned, outweigh the slight deterioration in slide quality. The bulk of smear slides reach the laboratory through the mail.

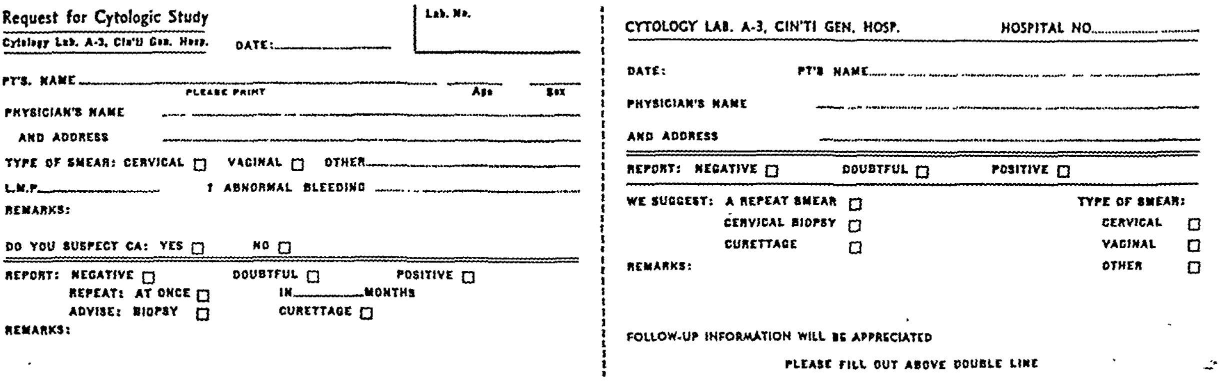
Smears, after being stained according to the Papanicolaou trichrome method, are mounted and screened by the laboratory technicians. Ink dots are used to mark questionable cells. It might be noted in passing that the use of wide-angle instead of standard ocular lenses permits a much larger microscopic field and therefore speeds the screening process.

From the Department of Surgery, Division of Gynecology, University of Cincinnati College of Medicine.

The smears are held for review by the cytologist if they (1) contain atypical cells of any kind; (2) are from patients with symptoms suggestive of carcinoma (e. g., intermenstrual bleeding); (3) are from patients concerning whom the attending physician has indicated some suggestion of cancer; or (4) are of any secretions originating outside the female genital tract.

Smears are categorized as negative, doubtful, or positive. No effort is made to identify the source of malignant cells or to distinguish between invasive and preinvasive carcinoma of the cervix. The cytologist may have an opinion about these things and often makes a private guess, but the ultimate decision must be left to the clinician and the pathologist. Rarely, unless asked, do we suggest a plan of study for the patient with a doubtful or positive smear. The clinician is in a better position to exercise such judgment than the cytologist.

Errors and Safeguards



Request for Cytologic Study
Cytology Lab. A-3, Cin'ti Gen. Hosp. DATE:
Lab. No.

PT'S. NAME ____ (PLEASE PRINT) ____ Age ____ Sex
PHYSICIAN'S NAME ____
AND ADDRESS ____
TYPE OF SMEAR: CERVICAL ☐ VAGINAL ☐ OTHER ____
L.M.P. ____ ? ABNORMAL BLEEDING ____
REMARKS:

DO YOU SUSPECT CA: YES ☐ NO ☐

REPORT: NEGATIVE ☐ DOUBTFUL ☐ POSITIVE ☐
REPEAT: AT ONCE ☐ IN ____ MONTHS
ADVISE: BIOPSY ☐ CURETTAGE ☐
REMARKS:

CYTOLOGY LAB. A-3, CIN'TI GEN. HOSP. HOSPITAL NO. ____
DATE: PT'S NAME ____
PHYSICIAN'S NAME ____
AND ADDRESS ____
REPORT: NEGATIVE ☐ DOUBTFUL ☐ POSITIVE ☐
WE SUGGEST: A REPEAT SMEAR ☐
CERVICAL BIOPSY ☐
CURETTAGE ☐
TYPE OF SMEAR:
CERVICAL ☐
VAGINAL ☐
OTHER ☐
REMARKS:

FOLLOW-UP INFORMATION WILL BE APPRECIATED
PLEASE FILL OUT ABOVE DOUBLE LINE

Form for request for cytological examination.

In connection with the reporting of smears, it is of paramount importance that the laboratory firmly establish, in the minds of the clinicians to whom it is reporting, the limitations of the method. Hysterectomy done because of a positive genital smear and without biopsy confirmation, in a patient whose uterus contains no cancer, is a calamity always in the back of the cytologist's mind. Tantamount to this is the case of the woman who is subjected to hysterectomy under similar circumstances and whose cervix is subsequently found to contain grossly invasive carcinoma. Conversely, false-negative smears can lead a practitioner who does not understand the possibility of such reports into a do-nothing policy in the case of the patient with symptoms of genital carcinoma. The best way of avoiding these unpleasant occurrences is to discuss the technique in hospital staff meetings or over the telephone with physicians who have just started using the laboratory facilities. One specific safeguard used in our laboratory is the appendage to every negative report on a genital smear taken from a patient with postmenopausal bleeding of the following notation: "A negative smear in the postmenopausal bleeder does not rule out endometrial carcinoma." This is done because of the high incidence of endometrial carcinoma in patients with postmenopausal bleeding and the relatively higher incidence of false-negative smears in endometrial as opposed to cervical carcinoma.

It might be well, at this point, to consider some of the commoner causes of erroneous cytological diagnosis. Laboratory error may be divided into two main groups—negative error, in which the cytologist returns a negative report when the patient actually has a malignant lesion, and positive error, in which the cytologist returns a positive report and the patient has no demonstrable cancer. The clinician who understands the possibilities and sources of these errors is in a much better position to use the technique intelligently.

Factors in Negative Error

Misinterpretation.—To err is human, and the cytologist will make his share of interpretative mistakes. However, misinterpretation is not as common a source of negative error as might be expected. The finding of cellular atypia of any degree, if noted appropriately by the cytologist, will result in repeat smears and, if the changes are persistent, biopsy. When the pipet method is used faulty screening may miss the one or two abnormal cells on a slide, but when the Ayre spatula is used the abundance of atypical cells on the slide precludes this accident in practically all epidermoid cervical lesions.

Poor Choice of Application.—Theoretically study of the genital smear should, within the limits of its known accuracy, enable one to diagnose uterine cancer whether the latter is symptomatic or not. However, the major function of the smear is to arouse the suspicion of cancer where none previously existed; and when this has already been suggested by symptoms, the smear as a test for cancer no longer has a valid function. Poor choice of application means the use of the smear in cases in which other, more specific diagnostic measures are clearly warranted. The postmenopausal bleeder does not need a Papanicolaou smear, because her primary symptom has already suggested uterine cancer. In other words, the cytological technique is a screening technique and not one to be applied in lieu of specific diagnostic methods in the patient with symptoms.

Scanty or Poorly Prepared Smears.—The pathologist does not hesitate to return a report of "inadequate tissue for diagnosis." Such a decision is a little more difficult for the cytologist, because in the case of the scantiest smear he may accurately report that he has seen no malignant cells. It therefore becomes a matter of judgment as to when a smear is so scanty as to be inadequate, and occasionally the cytologist will make the mistake of reporting a scanty smear as negative when he should have returned no diagnosis and asked for a repeat smear. This is an easy trap to fall into, since the request of a repeat smear is a nuisance to the physician and the source, very often, of grave misgivings in the mind of the patient.

Many cytology laboratories, our own included, discourage the submission of bloody smears, and this policy has caused a certain amount of confusion in the minds of the clinicians. The structure of the greatest importance to the cytologist in his attempt to diagnose cancer by means of a smear is the nucleus. The primary advantage of the Papanicolaou trichrome stain is that it renders cytoplasm transparent and thus permits easy and accurate inspection of the nucleus. A frankly bloody smear loses this transparency and becomes, after staining, opaque. The cytologist, looking at such a smear, has the feeling that he is viewing cells through a muddy ocher filter. Nuclear detail is lost, and the cytologist is under a severe handicap. Small amounts of blood, on the other hand, as when the material being smeared is blood-streaked, present no obstacle to effective examination.

Other Errors.—A particularly humiliating source of error to the cytologist is superficial necrosis in an obvious, advanced carcinoma. Such necrosis results in poor detail in exfoliated cells and in some cases no cellular detail at all. If a negative report is returned under such circumstances the cytologist is sure to receive an indignant call from the attending physician who does not understand how the technique can miss obvious cancer and yet be expected to pick up very early lesions. The answer, again, is that, given an apparent lesion, the diagnostic choice should be biopsy, not smear.

Causes of Positive Error

Misinterpretation.—Cytological misinterpretation is by far the most frequent producer of false-positive smears in our laboratory. Certain benign cells, particularly degenerate endocervical cells, aberrant basal cells, and large histiocytes, may present nuclear alterations which can be confused with malignant changes. Careful observation, repeat smears, and experience are the only answers to such error.

Weakness in Cytological Technique.—A second cause of false-positive reports is a basic weakness in the cytological technique itself. Everyone is familiar with the nuclear abnormalities on which the cytologist depends for making a diagnosis of cancer—nuclear enlargements, increased nuclear:cytoplasmic ratio, irregular nuclear outline, hyperchromatism, and irregular deposition of chromatic material. However, it is also generally and vaguely believed that these changes are specific to malignant processes. This is incorrect. These changes are criteria, not of cancer per se, but of an increase in the rate of cellular division. Any process which increases the rate of cell growth can also produce nuclear atypia. The most striking examples of such nonmalignant atypia are found in genital smears taken from women who are pregnant or who are suffering from vaginitis. The cells in such smears may differ from truly malignant cells only in the degree of changes observed. Thus, the process of distinguishing the possibly malignant from the nonmalignant cell often becomes a problem not of distinguishing black from white but of evaluating intermediary shades of gray. This is a matter of cytological judgment, again, and therefore fallible.

Finding of Atypical Basal Cell Hyperplasia.—There is a process productive of false-positive reports which in my mind are not false-positive at all. Pathologists recognize a cervical lesion in which cellular changes, indistinguishable from preinvasive carcinoma of the cervix, occur but do not involve the full thickness of cervical epithelium. These cellular alterations affect the deeper cell layers but disappear in those layers nearest the epithelial surface. This lesion has been called atypical basal cell hyperplasia by most pathologists. Others, who feel that it represents a potentially malignant but reversible process, apply the term precancerous metaplasia.

When the Ayre spatula is used to obtain cervical cells for examination it may penetrate the superficial layers of normal cells and thereby pick up abnormal cells from more basal layers, leading to a positive report. Under these circumstances a positive report is returned on a patient who does not have cancer and must therefore be considered as falsely positive. On the other hand, the cells responsible for the diagnosis are morphologically indistinguishable from the cells which make up preinvasive carcinoma. This type of error leaves us unashamed.

False-Positive Findings Later Found Positive.—Finally, there are positive smears which cannot be substantiated at the time of initial investigation and are therefore deemed false but are eventually shown to be correct. The cancerous area exfoliating malignant cells may be so small as to be missed by punch biopsy. Such a tiny focus may also be missed by the pathologist if an insufficient number of blocks are made of an adequate amount of submitted tissue. And, rarely, the source of malignant cells found in a vaginal smear may be extrauterine, e. g., carcinoma cells from the bladder carried into the vagina at the time of urination.[5]

Effectiveness of Laboratory Screening

It is difficult to calibrate the effectiveness of a cytology laboratory, particularly one with a large work volume, in numerical figures. Usually when a report is made on the use of the cytological technique, an effort is made to determine the percentage of accuracy. Statistical reports in the national literature indicate the accuracy of the technique, as applied to the female genital tract, to be around 97%. This is not quite as impressive as might first appear. The 97% figure—indicating a total error of only 3%—is obtained by averaging out the positive error (that is, the number of positive reports returned in patients who did not have cancer) and the negative error (that is, the number of cases of cancer missed by smear). The positive error nationally is around 1% and the negative error around 10%. By averaging these two percentages together in relation to total patients screened, a total error of 3% is obtained. I think that this is medical sophistry. The most unpleasant thing that can happen to a patient with a false-positive report on a genital smear is an unnecessary cervical biopsy and/or dilation and curettage. A false-negative report, on the other hand, can contribute to the patient's death by cancer. The important figure, then, is the percentage of negative error.

Accurate figures concerning negative error[6] are difficult to obtain. A positive report calls for immediate investigation and, by that token, a positive error is usually detected quickly and reported to the laboratory. A negative error, however, is often not immediately apparent. Months or even years may elapse before an early occult lesion becomes overt. Determining negative error becomes a knotty problem, particularly when mass screening is in progress.

The following example may be used to show just how difficult this is. In 1955, an effort was made to determine the over-all accuracy of the cytology laboratory. We selected 1950 as the year for investigation, feeling that five years would, in the majority of instances, be sufficient time to permit cases of cryptic uterine cancer to become clinically evident. Lists of all patients screened in our laboratory that year, with dates and our reported diagnosis, were sent to all referring physicians with a column left blank for follow-up information.

A total of 5,609 vaginal smears were made in 1950. Of these, 357 necessitated subsequent tissue study (cervical biopsy or dilation and curettage). Physicians reported clinical follow-up studies of at least three years on 687 patients, which made a total of 1,044 women whose smear tests had been followed up. The incidence of positive error calculated from patients with subsequent tissue study was 3.5%. The incidence of negative error calculated from patients with subsequent tissue study was 7%. The incidence of negative error calculated from all patients with subsequent tissue study or clinical folow-up was 2%. The failure to obtain more follow-up data cannot be blamed entirely, or even in the majority of instances, on physicians. The greatest obstacle to compilation of adequate data was the patient who made only one or two visits and was subsequently lost to the original physician's surveillance.

In addition to the determination of percentage accuracy there is another perhaps more satisfactory way of estimating the efficacy of a screening technique. The basic, vital function of a cytology laboratory is the detection of cancer which would have been missed had it not been for the routine application of cytological technique. On the request form submitted with each smear is an item asking the physician to state (by check mark) whether or not he suspects cancer. In the event that the smear leads to a diagnosis of cancer and the above item has not been checked off, the physician is asked the same question by telephone. Only if the physician specifically denies any suspicion of cancer prior to the receipt of a doubtful or positive report is the patient included in the unsuspected list.

From Aug. 31, 1956, to Aug. 31, 1957, out of 21,200 patients screened, a doubtful or positive smear led to the diagnosis of unsuspected uterine cancer in 83 cases. From Aug. 31, 1957, to Aug 31, 1958, out of 27,602 cases screened, a doubtful or positive smear led to the diagnosis of unsuspected uterine cancer in 77 cases. Of these patients 49% had preinvasive carcinoma of the cervix, one of the few types of carcinoma in which permanent cure can be assured. It is my belief that these data strongly indicate the value of large-scale cytological screening of women for genital cancer.

1035-36 Carew Tower (2).

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APPARENT RECOVERY IN CHRONIC LYMPHOCYTIC LEUKEMIA

REPORT OF A CASE WITH FIVE-YEAR REMISSION AND NO CLINICAL OR HEMATOLOGICAL EVIDENCE OF THE DISEASE

Carl Reich, M.D., New York

A patient experienced sudden relief from the splenomegaly and other signs and symptoms of lymphatic leukemia and has remained free from all manifestations of the disease for more than five years. The onset occurred with rapid loss of weight in August, 1951, when the patient was 52 years old. Physical findings, hematological data, and results of lymph node biopsy were typical of chronic lymphatic leukemia. Treatment included repeated transfusions of whole blood, roentgenotherapy applied to the much enlarged spleen, and injections of liver extract. For two years the patient did not improve except temporarily after transfusions. The splenomegaly subsided abruptly in August, 1953, and when the patient was reexamined in September, 1953, her weight, appearance, blood cell count, and bone marrow were normal. They have remained so.

In most textbooks on medicine, leukemia is described as invariably fatal. A few patients have been reported who apparently recovered, but the diagnosis was usually doubtful and the reviewers[1] of these cases have always mentioned them with some reservations.

The case of lymphocytic (lymphatic) leukemia reported here occurred in a woman first seen by me in August, 1951. The diagnosis satisfied all the criteria of modern hematology, and the patient is alive and well today. A brief summary of the case history follows.

Report of a Case

A 52-year-old woman presented herself at the hematology clinic of Lenox Hill Hospital in August, 1951. She had been ill for a few months and had lost 42 lb. (19.1 kg.) in weight. Her normal weight was 160 lb. (72.6 kg.). She was pale, her gums were puffy and oozing, and she looked chronically ill. She had been born in Limerick, Ireland, March 3, 1898. Her mother had died of pneumonia. The patient was married and had eight children. At the age of 38 she had had a gallstone attack but no operation. Menopause occurred when she was 51. She did not smoke or drink. In February, 1951, she had been operated on for varicose veins at Lenox Hill Hospital. Her blood findings were normal at that time. Determinations done at that time were as follows: hematocrit value, 44%; hemoglobin level, 95% (14 Gm. per 100 cc.); red blood cell count, 4,600,000 per cubic millimeter; white blood cell count, 7,200 per cubic millimeter, with 68% neutrophil polymorphonuclear cells (8 nonfilamented cells), 19% lymphocytes, 9% monocytes, 3% eosinophils, and 1% basophils; and platelets, 200,000 per cubic millimeter.

On physical examination, the positive findings were a marked enlargement of the spleen and liver and a generalized lymphadenopathy. There had been no history of a previous febrile illness, and she had not been exposed to any chemicals. The blood findings in August, 1951, were as follows: hemoglobin level, 45%; red blood cell count, 2,600,000 per cubic millimeter; white blood cell count, 52,000 per cubic millimeter, with 81% lymphocytes, 18% polymorphonuclear cells, and 1% monocytes; and platelets, 90,000 per cubic millimeter. The lymphocytes were of the small type. There were no Downey cells, and the heterophil agglutination test gave negative results. The sternal bone marrow (fig. 1) showed marked infiltration by small lymphocytes and was considered typical of chronic lymphocytic leukemia. A cervical lymph node (fig. 2) was removed on Aug. 9, 1951, and the report of the pathologists, Drs. R. M. Paltauf and G. L. Rohdenburg, was as follows: "Microscopic examination reveals a lymph node the normal architecture of which is obscured. All the sinusoids are filled with large and small lymphocytes and similar cells are seen infiltrating the capsule. Diagnosis: lymphocytic (lymphatic) leukemia."

She was then treated by transfusion and x-ray. Her blood group was O, Rh-positive. She had seven hospital admissions, during which she received 22,500 cc. of whole blood. Transfusions were given on the following dates: Aug. 7, 8, 9, and 11, 1951, Feb. 26 and 27, May 2, Sept. 18, 22, and 24, and Dec. 19, 20, 21, and 22, 1952, and Feb. 10, 11, 13, 14, and 15 and April 12, 13, and 14, 1953. She was also given x-ray treatment to the anterior part of the spleen according to the following schedule: A Picker oil-cooled machine was used, with 200 kv., 15 ma., target-skin distance 50 cm., portal size 10 by 15 cm., 0.5 mm. Cu–1 mm. Al filtration, and 36 r

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From the Medical Service, Lenox Hill Hospital.

per minute. Irradiation was given for two and three-fourths minutes (100 r) the first day of therapy and five and one-half minutes (200 r) subsequently for a total of six times and 1,100 r. The dates of therapy were Dec. 22, 24, and 29, 1952, and Jan. 2 and March 26 and 31, 1953.

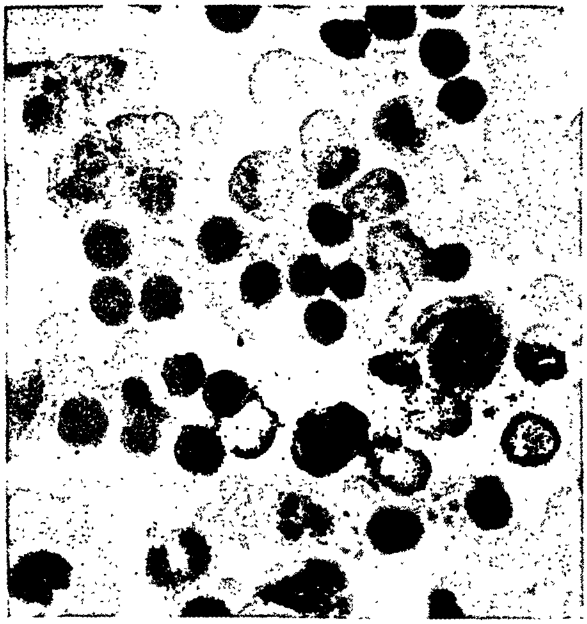

Fig. 1.—Photomicrograph of sternal bone marrow, taken in August, 1951, showing marked infiltration by small lymphocytes.

When she was not in the hospital she was treated at the clinic, where she received a total of 56 injections of liver extract. Following are some interesting notes from her chart: On Sept. 27, 1951, medical attendant Dr. T. J. Morrison noted the spleen to be hard and to extend below the iliac crest and the lymph nodes to be enlarged. On Dec. 4, 1951, Dr. H. Kessler of the tumor clinic examined the patient, found the spleen palpable below the iliac crest, and gave the diagnosis of chronic lymphocytic leukemia. On Dec. 5, medical attendant Dr. R. Gearhardt noted generalized lymphadenopathy and the spleen markedly enlarged and hard. A similar notation was made by medical attendant Dr. Robert Schleussner on Feb. 18, 1952. On April 14, 1952, pain, aching in character, in the left upper quadrant was noted by medical attendant Dr. Colter Rule. On May 3, 1952, the diagnosis of chronic lymphocytic leukemia with splenic infarct was made by Dr. Edgar Lawrence, medical director. At that time blood findings included white blood cell count 45,500 per cubic millimeter, with some blast cells and 85% lymphocytes, hemoglobin level 9 Gm. per 100 cc., and red blood cell count 3,100,000 per cubic millimeter. The diagnosis of chronic lymphocytic leukemia with splenic infarct was again given on Oct. 2, 1952, when blood findings showed the hemoglobin level to be 7 Gm. per 100 cc., white blood cell count 51,000 per cubic millimeter, with 87% lymphocytes, and blood urea nitrogen level 40 mg. per 100 cc. On July 9, 1953, physical examination, done by Dr. Alexander Vongries, chief medical resident, revealed the patient to be poorly nourished, pale, and chronically ill. Her gums were pale, soft, and spongy and bled easily. The spleen was firm and tender and extended below the iliac crest. The liver was palpable three fingerbreadths below the costal margin. The cervical, axillary, and inguinal nodes were enlarged. The diagnosis was chronic lymphocytic leukemia.

As seen by these clinical notes by various attending physicians, she made no progress from August, 1951, to July, 1953. The spleen remained just as large and just as hard, and the liver and lymph nodes also remained enlarged.

The anemia persisted except for temporary improvement after transfusions, and the white blood cell count varied from time to time, depending on the x-ray effect.

Finally, in July, 1953, she came to me and asked if she could revisit Ireland before she died. I consented, and she left by plane with her sister. On her return from Ireland in September of the same year I saw her again and hardly recognized her. She had gained 25 lb. (11.3 kg.) in weight, and her skin was ruddy. The lymph nodes were no longer enlarged, and the spleen and liver were normal in size. She told me that one evening in August, while sitting in front of the fire in her little home outside of Limerick, she put her hand on

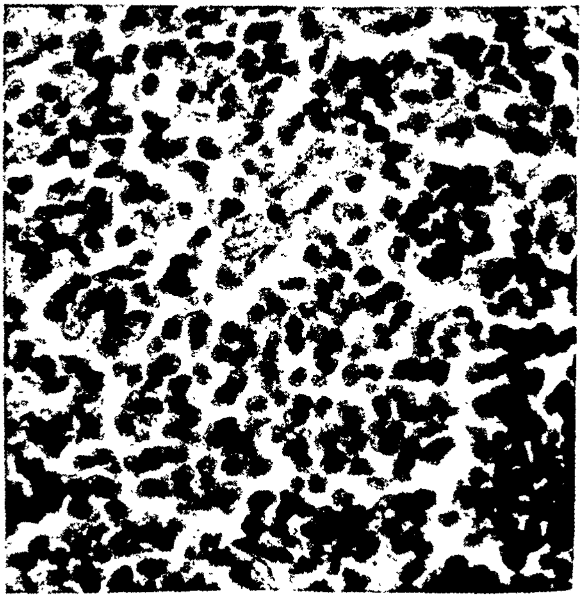

Fig. 2.—Photomicrograph of lymph node, taken in August, 1951, showing obscuring of normal architecture.

her abdomen, and, instead of the usual hard mass which had been present, the entire abdomen was now soft. Her blood cell count and bone marrow were normal on subsequent examination.

Over the succeeding years, careful, repeated blood and bone marrow tests have been done, and all have given normal results.

Typical blood findings (March, 1958) have been as follows: hematocrit value, 46%; hemoglobin level, 100% (14.5 Gm. per 100 cc.); red blood cell count, 5,000,000 per cubic millimeter; white blood cell count, 7,500 per cubic millimeter, with 67% neutrophil polymorphonuclear cells (9 nonfilamented cells), 17% lymphocytes, 12% monocytes, 3% eosinophils, and 1% basophils; and platelets, 200,000 per cubic millimeter. A photomicrograph of the sternal bone marrow, taken in March, 1958, is shown in figure 3.

On May 21, 1958, Dr. Claude E. Forkner examined the patient and reviewed the lymph node section and bone marrow smears. He was of the opionion that the bone marrow and lymph node sections taken in March, 1951, were typical of lymphocytic leukemia. He also noted that the patient showed no clinical evidence of leukemia on May 21, 1958, and that the blood and bone marrow taken March, 1958, were completely normal. His personal note is as follows:

"This patient would seem to represent an almost unique situation in which she has remained well without treatment for a period of five years. In spite of the prolonged and apparently complete remission she should be followed with care for any indication of relapse. Patients with chronic lymphocytic leukemia on rare occasions may have long asymptomatic remissions but usually such remissions are not complete so far as the blood count is concerned. The wise physician refrains from treating patients with asymptomatic chronic leukemia because of its possibility of upsetting an equilibrium in which natural forces are holding the disease in check."

On June 20, 1958, this patient was presented before the entire medical staff at Lenox Hill Hospital at a weekly conference. Dr. Edgar Lawrence was the chairman, and Dr. Claude E. Forkner led the discussion. Everyone present was satisfied with the evidence presented, and there was no dissenting discussion.

The following recent review of the pathology of the lymph node removed in August, 1951, was made by Dr. Maurice N. Richter, director, department of pathology, New York University–Bellevue Medical Center: "The section of lymph node . . . is from a case of malignant lymphoma and is quite consistent with the clinical diagnosis of lymphatic leukemia."

Comment

It is possible that this patient is in a period of prolonged remission. In leukemia, especially of the lymphocytic type, a long remission may either occur spontaneously or be produced by therapy. However, this case is distinguished by the fact that for the last five years the patient has shown no clinical or hematological evidence of the disease.

This finding leads to many interesting speculations. It is possible that some factor in the blood of one of the donors may have had a salutory effect on the outcome of her disease. Whatever the cause of her recovery, the important lesson to be learned from this case is that there is hope even in such a dreadful disease as leukemia. This should give some comfort to the many patients suffering from leukemia and to their anxious relatives.

Summary

In a case of chronic lymphocytic leukemia, complete recovery has apparently taken place and has persisted for five years. The diagnosis was substantiated by typical blood, bone marrow, and lymph node biopsy findings, as well as a two-year hospital course typical of a severe leukemia. The patient subsequently has had a five-year period of complete freedom from any physical, blood, or bone marrow abnormalities. These observations provide a note of hope on the outlook of leukemia.

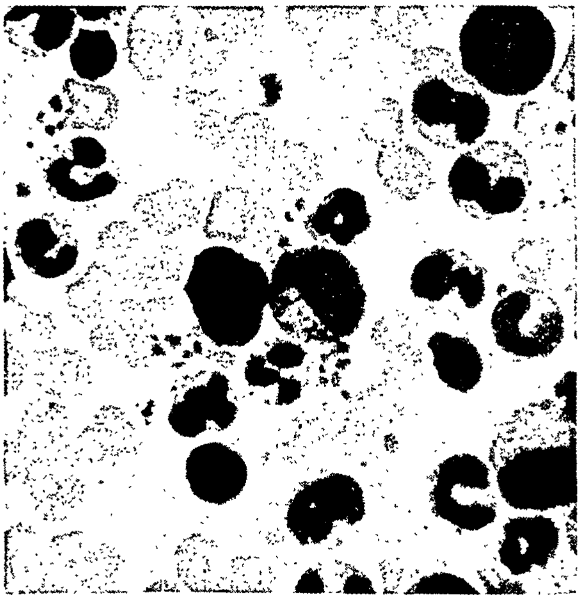

Fig. 3.—Photomicrograph of normal sternal bone marrow, taken in March, 1958.

19 E. 80th St.

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COMMON OCULAR TRAUMA

Dan M. Gordon, M.D., New York

Physicians who are not ophthalmologists sometimes are obliged to treat eye injuries either because of the nature of their practice or because the situation demands immediate medical care. The minimum equipment includes some form of magnifier, a source of light, and a treatment tray, the contents of which are here listed. Chemicals splashed into the eye must be removed by immediate washing if possible, and time should not be lost searching for appropriate neutralizers. Penetrating wounds of the cornea are dangerous, especially if they have perforated the lens or iris. If a corneal injury is too deep for immediate diagnosis or treatment, the eye should be covered and immobilized until expert attention can be given in favorable surroundings. The infrared radiation from an atomic flash, even at distances exceeding 70 km. (45 miles), can cause a choroidal burn before the blink reflex can close the eye. Safety measures to forestall injury are best, but when injury has occurred rational first aid minimizes later complications.

The frequency with which a physician sees a specific type of ocular injury depends on the nature of his practice. In an industrial neighborhood foreign bodies and flash and hot oil burns would be most common. In a residential section, with a high percentage of housewives, there would be injuries due to foreign bodies, corneal abrasions caused by brushes and infants' fingernails, and contusions due to open cabinet doors. In the event of a thermonuclear attack, radiation burns would present problems entirely different from those of everyday practice. The most common ocular injuries are those due to foreign bodies; direct blows causing abrasions, contusions, and lacerations; and thermal, chemical, or radiation burns.

The presence of anything in the eye which does not belong there constitutes an emergency. The foreign material must be removed by the quickest, safest method possible, usually by irrigation with water or some other bland fluid. Educational programs for children, workers, and housewives should stress the importance of immediate and copious irrigation with water, milk, or any other bland fluid when foreign material of any type enters the eye. After this generous eye bath the patient should consult a physician. Immediate attention will often prevent blindness, especially in the case of chemical burns.

Workers who are exposed to flying objects or sources of flame should wear goggles. Hobbyists and "do-it-yourselfers" should be warned to use adequate protective devices. Incidentally, any patient who is struck in the eye with a flying particle while he is using a hammer or other metal object should be instructed to bring in the tool so that it can be determined whether it is magnetic or nonmagnetic. It will also be helpful to locate the particle, because it can then be matched against the tool from which it came to see if any missing portion may still be within the eye.

Materials and Method

This paper is directed at those who are not ophthalmologists yet who may find it necessary to treat eye injuries, either because of the nature of their practice or because the exigencies of the situation demand medical care before a specialist can be summoned. Visual loss which is not obviously of a temporary nature demands consultation and treatment by an ophthalmologist. Before the nonspecialist can treat ocular injuries he must be prepared to approach the eye. This demands a minimum amount of equipment, including (1) some form of magnification, preferably a loupe, consisting of a combination of convex lenses and prisms, which can be worn either as an eyeglass or in a head band; (2) a source of focal light, preferably a floor lamp, which throws a bright, narrow beam; (3) a treatment tray which should contain cotton balls; toothpick swabs; sterile fluid for irrigation, preferably in a squeeze bottle or an atomizer; topical anesthetic (0.5% tetracaine solution, proparacaine hydrochloride [Ophthaine], or benoxinate [Dorsacaine] hydrochloride, not cocaine); a spud for removing foreign bodies or hypodermic needles which can be used for the same purpose; fluorescein for staining the cornea; a lid retractor; a cycloplegic drug (0.5% homatropine solution or 0.5% cyclopentolate hydrochloride solution); eye pads; and scotch tape.

Although fluorescein solution comes in bottles of 1.0% concentration it is preferable to use fluorescein strips which come in individual, sterile packages. Since fluorescein is an excellent culture medium for Pseudomonas aeruginosa (pyocyanea), the individual strips eliminate the dangers of contamination inherent in using bottles of the solution. Actually, the less one relies on stock bottles and eye droppers the less is the danger of contamination. If a lid retractor is not available a heavy bent hairpin may serve the purpose. While cycloplegic drugs should

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From the New York Hospital–Cornell University Medical Center and the L. Margolyes League.

Read in part before the 12th Clinical Meeting of the American Medical Association, Minneapolis, Dec. 3, 1958.

be available they should rarely be used by the general practitioner and never after the removal of a simple foreign body. Many patients have been practically immobilized for a week or two by a dilated pupil, caused by the unnecessary instillation of atropine, after a trivial injury.

It is mandatory to obtain a history of the accident, preferably from the patient himself, at the first visit, before "compensationitis" has had a chance to set in. It is amazing how often a simple foreign body in one eye will cause a need for reading glasses in a person over 40 years of age. He has consciously or unconsciously neglected to do anything about his presbyopia before the accident and now becomes convinced that it was caused by the foreign body. Also, long after the accident has occurred the patient is frequently persuaded that the "rich" insurance companies are in a better position to take care of him than he is. If possible, vision with and without glasses should be determined and recorded before the eye is treated. Prognosis should not be discussed until the outcome is certain.

Every physician should learn how to evert the upper lid. It is important to have complete control of the patient. If the upper or lower lid is held firmly against the superior or inferior bony margin of the orbit, the patient will be unable to close his eyes when he squeezes. A head rest makes immobilization easier.

Whenever the cornea is involved it should be stained with fluorescein so that any denuded areas may be more effectively highlighted. A drop of fluorescein is instilled into the anesthetized eye. After a minute the eye is irrigated with sterile saline solution or water. It is advisable to place a plastic apron of the type used in beauty parlors around the patient's neck as people resent having their clothes saturated with irrigating solution, especially if it is tinged with fluorescein. In addition to the major advantage listed above, the use of fluorescein strips will diminish this possibility. The patient should be asked to look up and the fluorescein strip can be placed inside the lower lid of the anesthetized eye, which should then be closed for a few moments. Irrigation is unnecessary. The eye may then be examined with good focal illumination and magnification.

Some important points to remember in examining an eye, in addition to those that have been mentioned above, are as follows: 1. Always evert the upper lid, since foreign bodies commonly tend to lodge on the shelf just inside the upper lid border. 2. If a foreign body cannot be found, hold the everted upper lid up while the patient looks down, and explore behind the lid with a moistened, tightly wound cotton toothpick swab to ascertain if any foreign material is lodged in that blind area of the cul-de-sac. 3. Irregularity of the light reflexes on the cornea or loss of the normal mirror-like relucency of the cornea indicates corneal injury or edema. 4. Blood in the anterior chamber, dilation or paralysis of the pupil not due to medication, distortion of the pupil, or subconjunctival hemorrhage after a history of a blow to the eye indicates possible ocular damage. A shallow anterior chamber in comparison with the other eye points to a probable penetrating injury. 5. Normal vision is compatible with serious eye injuries. 6. Always examine with an ophthalmoscope, employing a highly convex lens (+12 or +15) and starting 6 or 8 in. from the patient's eye. Focus on the pupil and the red reflex, and slowly decrease the degree of convexity as you approach the pupil and examine the fundus. A corneal scar, foreign body, or lens opacity is seen as a dark spot in the red reflex. If there is vitreous hemorrhage or a large retinal detachment the normal round, red reflex will be obscured or absent. A large vitreous hemorrhage will cause a black reflex. If fundus examination reveals any abnormality, consultation with an ophthalmologist should be secured. A retinal detachment is usually seen as a gray elevated area over which the retinal vessels are black rather than red. 7. An iris which trembles during movement of the eye indicates that the lens is either dislocated or absent. 8. A "black eye" or bleeding from the nose or ears following a head injury may indicate cranial damage.

Injuries to the Orbit

Injuries to the orbits may involve soft tissue trauma with bleeding, lacerations of the brow, or fractures of the orbital rim. An important injury is the "Herb Score" type, in which the patient is struck in the region of the orbit with a baseball or softball. This is commonly seen in adults who play rarely and who have not learned that men should not play boys' games. The orbital rim will usually cushion a blow against the eye unless the offending object hits the relatively unprotected temporal side. A softball, with its larger circumference, is more apt to cause bony injury than is a baseball.

Emphysema and crepitation on palpation suggest fracture of the orbital rim and demand x-ray examination. When a fracture of the floor of the orbit is not promptly corrected the eyeball will drop and severe diplopia will result. Simple lacerations of the orbital skin are sutured in routine fashion. Sudden loss of vision accompanying an injury to the globe may mean fracture of the orbit resulting in laceration of the optic nerve or hemorrhage into the nerve sheath.

Blows to the lids most commonly cause ecchymosis, the common black-and-blue eye. This rapidly responds to daily intramuscular injections of 1 cc. of chymotrypsin. The injection of 20 units of hyaluronidase into the discolored area will stimulate more rapid absorption of the blood. This is inadvisable in aged and debilitated patients, however, as it may produce more bleeding.

Simple lacerations of the skin may be closed with 00000 or 000000 silk sutures. If the laceration is through the lash margin of the lid, one must approximate the cut distal edges or else lid notching will occur. When the laceration is deep the lid must be closed in layers. If the laceration extends through the conjunctiva, the cut ends of the sutures should be buried within the lid or they will abrade the cornea. If the laceration is between the punctum and the nose one should ascertain whether the lacrimal canaliculus is severed, as this calls for specialized care. If an ophthalmologist is not available, the physician should attempt to push a fine wire, polyethylene tubing, or stiff catgut suture through the punctum and then out the cut end of the canaliculus and into its other cut end as far as possible. Because of its delicacy, loss of any appreciable amount of lid skin demands plastic surgery to prevent lid distortion with eversion of the lash margins and consequent lacrimating and discomfort, or inversion of the lash margins with resultant denuding and scarring of the cornea. Partially severed ocular tissues which hang down, as, for example, the edge of an eyelid with its lashes, and are almost completely separated from the rest of the lid will often heal with amazing rapidity. Extensive débridement or excision of such dangling tissue areas should not be done unless absolutely indicated.

Injuries to the Conjunctiva and Cornea

Small lacerations of the conjunctiva need not be sutured. Any laceration of the conjunctiva means that a penetrating injury must be ruled out. Chemicals which enter the conjunctival sac must be removed immediately by copious irrigation. Solid chemical particles which remain, especially lime and plaster, must be removed with fine forceps. The area of the upper cul-de-sac should be thoroughly irrigated. Corneal and conjunctival injuries present similar problems when chemicals are involved. Acid burns tend to cause immediate, usually localized, nonprogressive tissue necrosis. Alkali burns, such as those due to plaster and lime, are dangerous and progressive, especially if any residual particles are not removed. At this point it must be emphasized that neutralization of chemicals is passé. One no longer waits to neutralize a chemical, but washes it out as rapidly as possible. The patient's eye should be irrigated promptly at the work site with water from a pan, bucket, hose, or any other handy source of supply, or his head should be held in a bucket of water or under a running tap with the lids forcibly held open.

Corneal burns heal more rapidly when treated with topically administered steroids. Chemical gases may penetrate the cornea and enter the globe, necessitating paracentesis of the anterior chamber. This procedure demands the attention of an ophthalmologist. The danger of this type of injury should be borne in mind.

When chemicals enter the cul-de-sac they may create adhesions between the abraded conjunctiva and the cornea. These should be prevented by (1) instilling bland ointments between the lids, (2) avoiding complete immobilization of the eye for long periods, and (3) inserting a shape-retaining conformer made of dental wax or some similar material into the cul-de-sac if the burn is severe. Occasionally, contaminated foreign material in the cul-de-sac will result in an internal (meibomianitis) or external hordeolum (sty) after several days.

The physician's aims are to control pain, remove foreign substances, stimulate healing, or at least not interfere with it, prevent anatomic distortions, and produce maximal visual recovery. To that end, topical anesthesia may be used when the patient is first seen, but as infrequently as possible thereafter. Where intense lid spasm is present the anesthetic will enable the patient to open his own eyes and cooperate with the physician, but topical anesthetics tend to delay healing and should therefore be used sparingly. Antibiotic ointments also tend to interfere with healing and should be used only if infection is present or feared. One should never put any medicament into the eye just for the sake of doing something. Topically administered steroids are not indicated after the removal of simple corneal foreign bodies and may be deleterious in the event that herpes simplex virus is present. Steroids minimize reactions in keratitis after reactions to incomplete rust ring removal. Contamination in the physician's office may result in infection of the wound and possible loss of the eye. Sterile solutions and instruments should be used; this means that one should not have his solutions made up by the druggist but should buy already prepared sterile products.

Metallic foreign bodies are usually associated with rust rings. The foreign body can be lifted out with the tip of a sterile cataract knife, a corneal spud, or a hypodermic needle with use of focal illumination and magnification. If the foreign body is deep in the cornea it should be removed by an ophthalmologist. An iris freckle must not be mistaken for a corneal foreign body. The eye should be patched after a corneal foreign body has been removed.

Removal of rust rings is difficult and usually requires the use of a slit lamp. At times one can touch the area of the rust ring gently with 1% silver nitrate solution on the tip of a tightly wrapped applicator. The eye should then be patched for 24 hours. The next day the whole area can usually be lifted out with the sharply pointed end of a narrow knife or a needle. It is not advisable, however, for a nonophthalmologist to apply silver nitrate solution to the cornea, and this procedure should be attempted only in emergency situations.

Occasionally a large number of foreign bodies will be seen in a cornea. When it is evident that attempted removal of these foreign bodies, especially in the pupillary area, might result in considerable corneal scarring and consequent loss of vision, it may be wise to wait and allow the foreign bodies to extrude themselves. I have seen two cases in which the corneas were spattered with hundreds of foreign bodies as a result of backfire during target practice. In both cases, the foreign bodies extruded spontaneously over a period of months. Attempts at removal would have resulted in considerable visual loss because of corneal scarring caused by the instrumentation. This advice does not apply, however, when metallic foreign bodies are present; these should always be removed as promptly as possible.

If a protruding foreign body has penetrated through the cornea into the anterior chamber it is best not to attempt removal but to refer the case immediately to an ophthalmologist. Attempts to remove these protruding foreign bodies frequently result in breaking them off, rendering later removal difficult.

Corneal abrasions rarely require more than a cleansing irrigation and a tight pressure patch for from 24 to 48 hours. A double eye pad should be affixed with multiple strips of firmly placed adhesive tape to produce the desired pressure and immobilization of the abraded globe.

When the attending physician cannot handle a corneal injury or estimate its gravity, the eye should be patched and thus immobilized until more expert attention can be secured. If the injury is a penetrating one both eyes should be patched. Corneal lacerations may require suturing. Blows or lacerating injuries to the cornea demand ophthalmoscopic examination to rule out hemorrhage, retinal edema, or detachment. Blows to the eye may produce ruptures of the choroid which are seen as semilunar white rings, concentric and usually temporal to the optic nerve. Traumatic anterior chamber hemorrhages tend to be recurrent and may produce secondary glaucoma.

Penetrating wounds of the cornea are always potentially dangerous, especially if they have perforated the lens or iris. One should note the depth of the anterior chamber by comparing it to the other eye. If a pupil is irregular or protrudes through the laceration an ophthalmologist should be consulted immediately. One should avoid the error of trying to wipe a blood clot away from a wound only to discover that it is a prolapsed iris. If the services of an ophthalmologist are not available when the iris is prolapsed the prolapsed portion should be excised with sterile scissors, after which a cycloplegic such as atropine should be instilled. Deep injuries of the cornea and iris are accompanied by iritis.

Burns

Flash burns and ultraviolet radiation burns of the cornea rarely cause any serious problem except for the initial discomfort and lid spasm, which may last for several days. Burns due to boiling water, flames, or hot grease which have not caused serious corneal damage also belong in this category. A drop of topical anesthetic should be immediately instilled into the eye of the victim to show him that he can open his lids and that he has not been blinded. Such burns are best treated with cold compresses, phenacaine (Holocaine) hydrochloride, epinephrine ointment several times a day for the first few days, a decongestant (tetrahydrozoline [Visine] hydrochloride, naphazoline [Privine] hydrochloride, or phenylephrine hydrochloride, ⅛% solution) two or three times a day, and ample reassurance. Lid burns should be treated in the same manner as skin burns elsewhere.

In these days of potential atomic warfare it is advisable for the physician to know something about ocular injuries during atomic attack. Byrnes and co-workers [1] have shown that it is possible for the eye of a person facing in the direction of the exploding weapon to suffer injury as far as 45 miles away from the blast. While the eye represents a relatively small portion of the total body area, its injury rate may be out of all proportion to its size. External eye burns due to atomic radiation are much like burns from other causes, the one difference being that because the blink reflex is much slower than the speed of the light delivered by the atomic flash the inside of the eyeballs may be burned before the blink reflex can close the lids. The atomic energy which is delivered to the inner eye through the open pupil results in a choroidal burn which is permanently damaging and for which little can be done. At the time of the burn there is considerable edema of the surrounding retina and choroid. It is probable that the immediate systemic administration of a large dose of ACTH or one of the steroids would prevent much of the damage due to the edema itself. The size of the pupil controls the amount of damage suffered by the inner eye. All other things being equal, including the distance from the exploding atomic weapon, less light intensity is delivered to the inside of the globe if the damage takes place in daylight when the pupil is normally narrower. If the explosion occurs at night when the pupil is normally dilated the damage is likely to be much more severe. The moral, then, is to avoid being anywhere near an exploding atomic weapon. If you are, and you cannot get to a safe place, arrange to be exposed in daylight, face in a direction opposite that from which the blast comes, and keep your eyes closed. One is apt to be lulled into false security by being many miles away from the explosion. As Byrnes has shown, this security becomes less with each increase in potency of atomic weapons.

Summary

The nonophthalmologist is commonly apt to encounter various ocular traumas and should know something of their management. In the main, this is one field where prevention through safety measures and prompt attention to rational first aid is often worth more than later attempts at cure.

441 E. 68th St. (21).

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Additional references are obtainable from the author on request.

RISTOCETIN—A STATISTICAL REVIEW OF THREE HUNDRED THIRTY-THREE CASES

Robert L. Herting, M.D., Brian Lees, M.R.C.P., Albert J. Zimmermann, B.A.
and
George H. Berryman, M.D., North Chicago, Ill.

Reports received by a manufacturer from physicians using ristocetin, a new antibiotic, were collated with reports published in clinical literature, and the results were analyzed. Among the total of 333 cases in which the drug was used, there were 126 cases of pneumonia, and approximately 70% of these were caused by staphylococci. There were 46 cases of subacute bacterial endocarditis, and approximately 50% of these were caused by staphylococci. The drug was given either by intravenous injection or prolonged intravenous infusion. The most frequent side-effects were thrombophlebitis (20 cases, 6% of the total) and neutropenia (18 cases, 5.4%). Side-effects were absent in 258 (77.5%) of the patients. The side-effects were most frequent in patients receiving the larger doses, and on the basis of these findings it is recommended that the dosage of this antibiotic in adult patients should not normally exceed 2 Gm. per day. Approximately 60% of the patients were completely cured.

When a new therapeutic agent is introduced, a pendulum is set swinging. Often, first reports are enthusiastic. Later, limitations in the use of the drug may become more apparent. Adverse reports may be the result of disappointment when the drug fails to serve as a universal panacea. Finally, the pendulum comes to rest as indications and limitations are generally recognized.

When a new antibiotic becomes available and when the use of this antibiotic is generally restricted to serious cases, it is difficult for any person to amass a large series of cases within a short time. Experience will vary, and conflicting reports may make it difficult to determine the over-all usefulness of the new agent.

In this situation, physicians working within the medical department of the manufacturing pharmaceutical house occupy a unique position. They have access to detailed clinical reports from many physicians, and if results from a comparatively large number of cases can be correlated and presented without bias this information should be of considerable value to the profession as a whole.

It has been our objective to review all clinical reports on ristocetin (Spontin) during the first year of its use. This survey embraces 333 cases and includes those published in the literature,[1] as well as reports submitted directly by clinicians to us. To minimize personal factors in the evaluation of these reports, analysis has been conducted entirely by machine methods.

Methods and Results of Study

Information from each of the 333 case reports was translated into a numerical code suitable for punching into a standard IBM card. No attempt was made to "edit" the information supplied by the reporting physician. The tables were compiled by sorting these punched cards into the categories indicated.

It can be appreciated that not all the case reports were as complete as we might have wished. The main departure from an "ideal" report was in the area of bacteriology. It can be seen from table 1 that in about 20% of the cases the causative organism was not designated. In many of the cases, too, sensitivity of the organism to various antibiotics was not recorded. Nevertheless, the figures indicate that staphylococcic infections were treated much more frequently than others.

Also in table 1, it can be seen that in approximately one-third of the patients treated with ristocetin the diagnosis of pneumonia was given. In this group of 126 patients, approximately 70% of the infections were staphylococcic. The next largest group, with subacute bacterial endocarditis, included 46 patients, with approximately 50% of the infections identified as staphylococcic and a further 15% as enterococcic.

A point of major interest with regard to a new therapeutic agent is the incidence and type of side-reactions which occur (table 2). Some interesting points emerge from this analysis. Almost 80% of the patients have shown no side-effects. In some instances, it has not been possible to determine whether a toxic effect should be attributed to the disease process, to the administration of another therapeutic agent, or to the administration of ristocetin. Such cases have included proteinuria (two), gastrointestinal upset (one), impairment of hearing (two), and acute anemia (one). The rarity of these occurrences and the fact that in every in-

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From the Department of Medicine, Abbott Laboratories.

Lancet accused the airlines of jeopard... using an artificial ...noes fro... gers' lives for money because they declined ... backward-facing seats in civil aircraft. The reason given is that this would reduce the payload of aircraft. The narrow abdominal belt provided was also criticized because it does not restrain the trunk, and, if there is a sudden stop, the head, trunk, and lower limbs are thrown forward and downward and are likely to be injured by striking the seat in front. In addition, the narrow belt can produce severe intra-abdominal or intrathoracic injuries because a great pressure is applied over a small area. Decelerative injuries do not occur when the area of

of spread... cal profession, ...ency to eliminate unnecessarily high surgery, properly ... of clinicians have used intra- welcomed by doctors. ...eriod of 5 to 15 minutes) ...enous infusion. This ... the incidence of

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World Health Assem... practices ...profess... ...tribute to a Health Assembly ... ing ... G. E. ...e (though program of ... Mr. ... ...first ex-

on the postoperative glyceride level of plasma. The author commented that perhaps the amount of dextrose given might have been too small to produce any effect. They received only 100 calories in two hours, while in the earlier series cited and composed of healthy persons, 1,000 calories was given over a period of four hours. The present report demonstrated no changes in phospholipid concentration after the infusion of dextrose. Here, as for the glycerides, the explanation might be that the amounts of calories given in the two studies differed widely.

... be ... Medical

Esophageal Perforation.—Perforatic... are members of gus is a serious injury that ... athletes, as a few of in connection with endo... escape publicity. Society ment. The use of th... what is going on in develop-... ...tz and Werner ...nts in ... and to know something about the ...concerned. So long as a doctor does not make ... what opportunities come his way to take an ...air advantage of his colleagues or to misrepre-...t or betray the profession there is no reason why ... should not appear on television if asked, or ...ite under his own name if he feels so inclined. ...e half-enforced ban that exists does nothing to ...ter persons who might profitably be deterred, ...ile intimidating others whose voices might, with ...vantage, be heard. Now that physicians work in National Health Service, one result of which is at their affairs can become at any time the subject

tration of total serum protein, accompanied by relative increase in fibrinogen and globulin leve... The protein abnormality increases in proportion the extent of the disease. It is of great practi... importance to determine whether or not hypopr... teinemia in cancer patients is produced by a speci... effect of the growth and to study its resistance ... preoperative therapy.

The two sexes ... ...nd the m... the ...uting to th... either medica... cancer. The asse... week ...nic out... give priority to... their ...in of v... water supplies ... pendit... A defin... coordinated ... maintai... noticed. P... supply and ... in the o... in childre... ices when ... of tensio... that Sing... adequate wat... emotions. Poliomy... tection and improv... needs ... ...re esse... of ... type occ... pensable for econom... and social developme... of health and are ... Within the past three years 56 countries and terr... tories have suffered epidemics of smallpox. Th... assembly asked for intensive campaigns to rid the world of this dangerous, disfiguring, and expensive disease, the cure for which has been known for more than 150 years.

The malaria eradication program is progressing well, but funds are lacking to finance WHO's continuing leadership in this global campaign. Governments, industry, foundations, and others were urged to join with WHO in eradicating malaria by contributing to the World Malaria Fund.

RISTOCE

on of the esopha-
occurs most frequently
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se procedures is increasing.
(*Acta chir. scandinav.* 116:401-
950/1959) analyzed a series of 24 patients
ad esophageal perforations, 7 of which proved
Of these two died of general sepsis, one of
ema, one of mediastinitis with empyema, one
mplications arising from too many blood trans-
ons, and two of mediastinal abscesses.

he important factor in traumatic perforation of
phagus is the presence of a rupture of such
ions as to permit esophageal or gastric con-
to contaminate the mediastinum. Full knowl-
of the topography of the cervical fasciae and
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ypoproteinemia and Gastric Carcinoma.—A study f 67 patients with gastric carcinoma was underaken by H. Sunzel (*Acta chir. scandinav.* 116:429-36, 1958/1959) in order to clarify the nature of the reoperative hypoproteinemia associated with that ondition. Hypoproteinemia does not appear to be pecific to cancer but may result from nutritional eficiency and pathological loss of protein. In paients with a history suggestive of protein depletion he operative mortality was found to be five times s high as in those without any such history of proein disorder. The excessive mortality was due to oor healing of the anastomosis and increased suseptibility to infection. Malignant neoplastic disase is often characterized by a decreased concen-

were about equally represented in undergoing partial or total gastrectomy for carcinoma of the stomach, and preoperative hypoproteinemia was observed in 34 instances. Inadequate intake owing to mechanical obstruction and excessive loss of protein due to hemorrhage appeared to be responsible for the hypoproteinemia. Patients with a history of protein depletion—not always reflected in the serum protein level because of coexistent dehydration—had an operative death rate of 31% as opposed to a rate of 6% in those in whom no similar history was recorded. It does not suffice to administer only protein or amino acids in the hope of restoring optimal protein synthesis. The administration of protein without accompanying calories to an emaciated patient results only in the utilization of the protein chiefly for energy requirements. Modern principles of treatment with a high-calorie diet plus protein may be capable of partially or wholly restoring the protein deficit in cancer patients before time leads to deterioration of the patient's condition due to the basic malignant disease.

UNITED KINGDOM

Stricter Test for Disability Urged.—A sterner line in assessing disability was suggested by Dr. H. C. J. L'Etang in the *Practitioner.* He cited the case of many men whose deafness, poor sight, disabled limbs, and diseases did not prevent their reaching the top in sports and asked whether the conscientious physician could definitely state that loss, or malfunction, of a limb, or special sense organ, invariably led to disability.

Echoencephalography.—An apparatus employing ultrasonic waves for diagnostic purposes was designed by Gordon (*Brit. M. J.* 1:1500, 1959). It is a modification of that used for detecting and locating submarines (asdic) and for detecting flaws in large masses of metal. The physical principle underlying the use of ultrasonic waves is the piezoelectric effect, that is the result of an electric charge on opposing surfaces of a crystal when under stress. At the frequencies employed in medicine the ultrasonic rays are produced by crystals of quartz or barium titanate. The rays are closer in type to sound waves than to radio or x-rays. They are backward and forward movements of the molecules of the transmitting medium.

stance there was an alternative explanation suggest that ristocetin was possibly not the responsible agent.

Also of interest is the clear relationship of side-effects to dosage. This is demonstrated in table 3. The recommended dosage of this antibiotic for most infections is 2 Gm. per day (for the adult patient). At this dosage level, side-effects have not been troublesome. However, it is clear that when this dosage is exceeded (and particularly when a dosage in excess of 3 Gm. a day is given), the incidence of side-effects rises steeply. It should also be recorded that a similar relationship can be demonstrated between the total dosage of ristocetin administered and the incidence of side-effects. It is known that ristocetin is excreted by the kidneys and that at high dosage (or when renal function is impaired) the antibiotic may accumulate in the blood and tissues. This laboratory finding probably accounts for the relationship between dosage and side-effects.

Table 1.—*Analysis of 333 Cases by Bacteriological and Pathological Diagnosis*

Organism	No. of Cases	%
Staphylococcus	211	63.4
Streptococcus	12	3.6
Pneumococcus	10	3.0
Enterococcus	11	3.3
Mixed organisms	16	4.8
Organism undesignated	73	21.9
Diagnosis		
Pneumonia	126	37.8
Subacute bacterial endocarditis	46	13.8
Septicemia	38	11.4
Abscesses	32	9.6
Osteomyelitis	24	7.2
Cellulitis	10	3.0
Enterocolitis	8	2.4
Wound, surgical infection	6	1.8
Furunculosis	7	2.1
Meningitis	3	0.9
Bronchitis	3	0.9
Cystitis	3	0.9
Peritonitis	3	0.9
All others	24	7.2

Table 2.—*Relative Incidence of Side-effects in 333 Cases*

	No. of Cases	%
None	258	77.5
Neutropenia	18	5.4
Drug fever	12	3.6
Skin rash	14	4.2
Depression of platelet count	5	1.5
Thrombophlebitis	20	6.0
All others	6	1.8

It should also be recorded that the over-all incidence of side-effects has declined during the later months of this first year of ristocetin usage. There are three possible explanations for this observation: 1. An improvement in the manufacturing process about six months ago eliminated certain impurities from ristocetin; the antibiotic is now prepared from pure crystalline material. 2. There has been a tendency to eliminate unnecessarily high dosage. 3. A number of clinicians have used intravenous injection (over a period of 5 to 15 minutes) rather than prolonged intravenous infusion. This technique has materially reduced the incidence of thrombophlebitis. It is a logical assumption that the second explanation should also contribute to a reduction in side-effects, and it is possible (though difficult to prove at this time) that the first explanation may be an additional factor.

Finally, it can be stated that these reports indicate that all side-effects from ristocetin are reversible. The most disturbing side-effect has been neutropenia, but this (together with other side-effects) has responded promptly to either discontinuance of medication or, in some instances, reduction in the dose of antibiotic.

Table 3.—*Incidence of Side-effects Related to Daily Dose*

Maximum Daily Dose, Gm.	Side-effects, %
0.1-0.9	3.1
1.0-1.9	9.4
2.0-2.9	21.2
3.0-3.9	37.8
4.0-4.9	41.0

An examination of the over-all results (table 4) shows that approximately 60% of the patients treated were completely cured. A further 17% were classed as "improved." This category usually included patients in whom the infection responded to antibiotic therapy but in whom a full return to health was prevented by other pathological conditions.

There remains 23% of cases in which "no response" was reported. A detailed examination of this group showed a high incidence of moribund or virtually "hopeless" cases. Often there was some complicating factor unamenable to antibiotic therapy. For example, in the pneumonia group, the illness might be the terminal event in a case of lung cancer. In the bacterial endocarditis group, cardiac function might be so impaired mechanically as to make recovery unlikely. An appreciable number of patients in whom "no response" was recorded received only a few doses of the antibiotic before death intervened.

Table 4.—*Analysis of Response to Treatment*

Organism	Cured, No.	Improved, No.	No Response, No.	Total
Staphylococcus	118	44	49	211
Streptococcus	5	1	6	12
Enterococcus	10	0	1	11
Pneumococcus	8	1	1	10
Mixed organisms	14	0	2	16
Organism undesignated	46	11	16	73
Total	201	57	75	333

Summary and Conclusions

In a review of detailed case reports on 333 patients treated with ristocetin (Spontin), statistical analysis by machine methods led to these conclusions: The major use for ristocetin has been the treatment of staphylococcic infections. Side-effects are seldom troublesome, if a daily dose of 2 Gm. is not exceeded. Side-effects rise steeply when dosage is increased. The most disturbing side-effect after the administration of ristocetin has been neutropenia. However, in all instances this has responded to either discontinuance of medication or reduction in dose. The administration of ristocetin has brought about a cure in 60% of the cases reviewed and improvement in a further 17%.

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NEW OPHTHALMIC DECONGESTANT, TETRAHYDROZOLINE HYDROCHLORIDE

CLINICAL USE IN 1,156 PATIENTS WITH CONJUNCTIVAL IRRITATION

Harold C. Menger, M.D., Brooklyn, N. Y.

Tetrahydrozoline hydrochloride is a sympathomimetic agent which causes local vasoconstriction when topically applied and a rise of blood pressure when given systemically. Instilled as a 0.05% solution into the eye, it was found to afford prompt relief, lasting from one to four hours; from the congestion accompanying allergic or chronic conjunctivitis. It was administered in doses of a single drop instilled into each eye two to four times daily in 1,156 patients with these conditions. This dose, while sufficient to give the desired relief in the majority of patients, had no side-effects beyond a mild, transient irritation. It did not raise the intraocular pressure and had no adverse effects when used for periods up to two years in patients with cataracts. There was no evidence that it affected the course of cataract or hindered recovery from chronic conjunctivitis or from the subacute stage of acute conjunctivitis.

Today, more than ever, the ophthalmologist is appreciative of the benefits accruing to patients from the use of nonspecific preparations in the management of conjunctivitis. Ideally, such adjunctive local preparations should have the following features: (1) optimum activity at low concentration; (2) few or no side-effects; (3) prolonged stability; and (4) no masking or increased likelihood of secondary infection.

Preliminary observations on tetrahydrozoline (Visine) hydrochloride, a unique pressor amine, indicate that it has optimum activity at a low concentration (0.05%). It has been reported that this agent is an effective and well-tolerated ophthalmic decongestant.[1] Because of the apparent utility of this decongestant, it was decided to thoroughly evaluate tetrahydrozoline in the short-term and long-term management of more than 1,000 patients with conjunctivitis of varying etiology.

Materials and Methods

A total of 1,156 patients with allergic or chronic conjunctivitis were treated with tetrahydrozoline eye drops (0.05%). Seventy-one children, aged 3-12 years, and 1,085 teen-agers and adults, aged 12-91 years, were included in this group. The dosage schedule was one drop instilled in each eye two to four times daily. As a rule, patients were maintained on therapy with this drug for periods ranging from two weeks to two months. To determine the effect on intraocular tension, over 100 patients with cataract received tetrahydrozoline daily for a period exceeding two years. Intraocular tension was determined periodically by means of the Schiötz tonometer.

Three hundred forty-eight patients with allergic conjunctivitis were included in this study. Of this number, 271 patients concurrently received antihistamines orally to help control other symptoms.

In this program there were 808 patients regarded as having chronic conjunctivitis. These cases were roughly classified as nonspecific conjunctivitis with chronic hyperemia, chronic conjunctivitis with cataract development (in various stages), or subsiding acute conjunctivitis. In the latter category, patients received decongestant medication after the local administration of antimicrobial agents or corticosteroids, as indicated.

Results

Allergic Conjunctivitis.—Tetrahydrozoline was found to be an effective decongestant in many cases of allergic conjunctivitis. The therapeutic efficiency was somewhat enhanced, as might be expected, by the simultaneous oral administration of antihistamine agents. Without antihistaminic therapy, the administration of tetrahydrozoline produced a good effect in 43 of 77 patients, gave a fair effect in 29 patients, and was ineffective in 5 patients. When administered with antihistamines, tetrahydrozoline effected a good result in 190 (70%) of 271 patients, a fair result in 74 patients (27%), and poor or no result in 7 patients. Of the 348 patients with allergic conjunctivitis, treatment with tetrahydrozoline produced a good result in 233 patients (67%) and a fair result in 103 (30%). Only 12 patients (3%) failed to report some beneficial response.

Chronic Conjunctivitis.—Tetrahydrozoline proved to be similarly useful in the management of chronic conjunctivitis. Good responses were seen in 73 (64%) of 116 patients with acute conjunctivitis in the subacute stage; a fair effect was noted in 38 patients (32%) with this indication; and 5 did not respond. Patients with nonspecific conjunctivitis with hyperemia responded almost equally well to therapy. Of 381 patients, 218 (57%) exhibited a good symptomatic response to treatment, 126 (33%) showed a fair effect, and 37 (10%) had no significant improvement. In 311 patients in whom a chronic mild secondary conjunctivitis or follicular conjunctivitis accompanied cataract development, a good response was observed in 158 (51%) and a fair effect in 104 (33%). Of the entire group of 808 patients with chronic conjunctivitis, treatment with tetrahydrozoline resulted in a good effect in 449 (56%) and a fair effect in 268 (33%). The onset of action was generally reported to occur immediately. The duration of response after each application varied from one to four hours.

Side-effects.—In no instance did intraocular tension increase. As previously mentioned, more than 100 patients receiving tetrahydrozoline for periods as long as two years were given periodic tonometric follow-up studies; in no case did pressure increase. None of the ophthalmic reflexes appeared to be impaired by the prolonged use of the drug. There was no apparent change in pupillary size. Twenty-five patients (2.1%) reported a mild stinging sensation with instillation; however, this effect dissipated rapidly. In no instances were rebound phenomena observed. In two cases, a mild subconjunctival hemorrhage occurred; however, it appeared that this effect may have resulted from trauma due to rubbing the eyes. Where cataracts existed there did not appear to be any detectable effect of tetrahydrozoline in retarding or accelerating the pathology. The incidence of secondary infection in this series was not materially different from that expected in any random series of patients; hence, the tetrahydrozoline was not thought to reduce local tissue resistance.

Summary

Treatment with tetrahydrozoline (Visine) hydrochloride ophthalmic drops provided effective decongestant action in 96% of the patients with allergic conjunctivitis and 89% of patients with various forms of chronic conjunctivitis. More than 100 patients with cataracts were treated with tetrahydrozoline over a period of two years; in no instance did intraocular pressure increase or any significant change occur in the development of the cataracts.

In addition to its excellent decongestant action, which provided prompt symptomatic relief, an important feature of tetrahydrozoline is its low incidence of side-effects. Side-effects were limited to a mild stinging sensation in 2.1% of the patients.

202 Weirfield St. (21).

The tetrahydrozoline hydrochloride used in this study was supplied as Visine hydrochloride by the Clinical Research Department, Research Division, Chas. Pfizer & Co., Inc., Brooklyn, N. Y.

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REPORT OF A SEROLOGICALLY PROVED CASE OF Q FEVER IN UTAH

Paul D. Hoeprich, M.D., John R. Ward, M.D.
and
Alexander M. Schmidt, M.D., Salt Lake City

Serologic evidence indicates that Q fever is widespread in Utah, but only one proved case has been reported previously. The second proved case occurred in a young man who worked with sheep hides. His illness started with severe malaise; subsequent symptoms were fever, headache, vomiting, profuse sweats, and cough. Radiographic examination of the chest showed a homogeneous pneumonia in the left upper lobe. Dramatic improvement began after chloramphenicol therapy was started. Q fever is caused by Ricksettsia burneti, primarily a parasite of the tick. Human-to-human transmission does not occur. The usual route of human infection is by inhalation of infected dust particles. Q fever presents as an undifferentiated pneumonia. It is specifically treatable with either chloramphenicol or any of the tetracyclines. Most of the Q fever in Utah is probably reported as influenza. Diagnosis is retrospective and is accomplished by demonstrating a rise in serum complement-fixing antibodies specific for Rickettsia burneti.

Q fever has been reported from most of the temperate and tropical areas of the world, including many states in the United States.[1] Excellent reviews dealing with this specific infectious disease are available.[2] Recently, Blank and associates [3] reported the county by county incidence of complement-fixing antibody to Q fever in residents of Utah. Serums from specimens submitted for serologic testing for syphilis, and from the American Red Cross donor service, enabled a sampling that ranged from 0.1% (Rich County) to 3.0% (Kane County) of the population of each county. Q fever antibodies were found either not at all (Daggett, Emery, Grand, Morgan, Piute, and Rich counties) or in as many as 7.7% of the serums examined (Sevier County). The authors remarked on the paradox of serologic evidence of Q fever in the absence of reports of clinical disease. This report of a case confirms the clinical presence of Q fever in Utah.

Report of a Case

A 20-year-old married male was admitted to the Salt Lake County General Hospital on Sept. 7, 1958, because of malaise and fever. Seven days before his entry, there was sudden onset of malaise sufficiently severe to cause the patient to stay home from his work as a handler of sheep pelts. Fever was noted four days before admission; dull suboccipital and bitemporal headache began the same day. Repeated vomiting, profuse sweats, and the onset of nonproductive cough three days prior to admission caused the patient to consult his physician. Penicillin was injected and tablets were prescribed, but no relief resulted. On the day of hospitalization, for the first time, a small amount of sputum was produced. There was no pleurisy, no sore throat, and no dyspnea or orthopnea.

Aside from influenza in the fall of 1957, the patient could recall no illnesses. The remainder of the patient's history and a review of systems was noncontributory. Neither the patient nor the members of his family had traveled outside of Utah within the six months before admission.

At entry, the patient's pulse was 80 beats per minute and regular, respirations were unhampered and regular at 16 per minute, blood pressure was 110/64 mm. Hg, and oral temperature was 104.2 F (40 C). There was obvious sweating; the skin was hot and moist and the face was flushed in appearance. There was no respiratory distress. The neck was supple and the trachea lay in midline. The respiratory movements of the chest were symmetrical. Vocal fremitus was increased over the upper anterior part of the left side of the chest, and there was decreased intensity of breath sounds with scattered, rather musical, inspiratory rales over the left side of the chest posteriorly. No abnormalities were found in the remainder of the physical examination.

The hematocrit was 44% and the icterus index 5. There were 11,400 white blood cells per cubic millimeter of blood, of which 32% were juvenile and 58% mature polymorphonuclear leukocytes, 9% lymphocytes, and 1% monocytes. Erythrocytes were normal in appearance, and platelets appeared adequate in numbers. A clean, midstream, specimen of voided urine had a specific gravity of 1.020, pH 5.0, no reducing substance or protein, and only a rare white blood cell per high-power field in sediment obtained by centrifugation. A stool specimen was negative for occult blood (guaiac).

From the Department of Internal Medicine, University of Utah College of Medicine and the Salt Lake County General Hospital.

The blood urea nitrogen level was 15 mg. per 100 ml.; fasting blood sugar level, 98 mg. per 100 ml.; and total protein value, 6 Gm. per 100 ml., with 4 Gm. of albumin per 100 ml. Four blood cultures and one urine culture were sterile. Throat and sputum cultures disclosed no pathogens. The Venereal Disease Research Laboratory test was nonreactive; there were no cold agglutinins in the serum. Skin tests with purified protein derivative (first and second strength), blastomycin, coccidioidin, and histoplasmin were all negative.

Radiographic examination of the chest on the day of admission showed a homogenous, segmental pneumonia in the left upper lobe. Subsequent films on the fifth and ninth hospital days showed resolution (fig. 1).

The hospital course (fig. 2) was one of little change until about 12 hours after chloramphenicol therapy was started on the fourth hospital day. Dramatic improvement began at this time, and thereafter recovery was uneventful. The patient was discharged home on Sept. 25, 1958. The results of complement-fixation tests were diagnostic of Q fever (see table). Serums were obtained from the patient's co-workers (15 specimens) and his immediate family (4 specimens); all were negative for Q fever antibodies by the complement-fixation test.

Comment

Q fever was first reported in Utah in 1956.[3] There have been no subsequent proved cases according to the records of both the Utah State Department of Health Laboratories and the Rock Mountain Laboratory of the U. S. Public Health Service in Hamilton, Mont.[4] In the survey of Blank and others,[3] 1.7% (statewide average) of Utah serums contained complement-fixing antibody to Q fever. Yet, in areas acknowledged to be endemic for Q fever, the incidence of positive Q fever complement-fixation reactions may be lower; e. g., in the greater Los Angeles area 8 of 687, or 1.2%, of routine premarital serums were positive.[5] The conclusion may fairly be drawn that there is Q fever in Utah but that the disease has, for the most part, not been diagnosed. Our patient's dramatic improvement with chloramphenicol therapy is testimony to the importance to the patient of considering Q fever in the differential diagnosis of pneumonia.

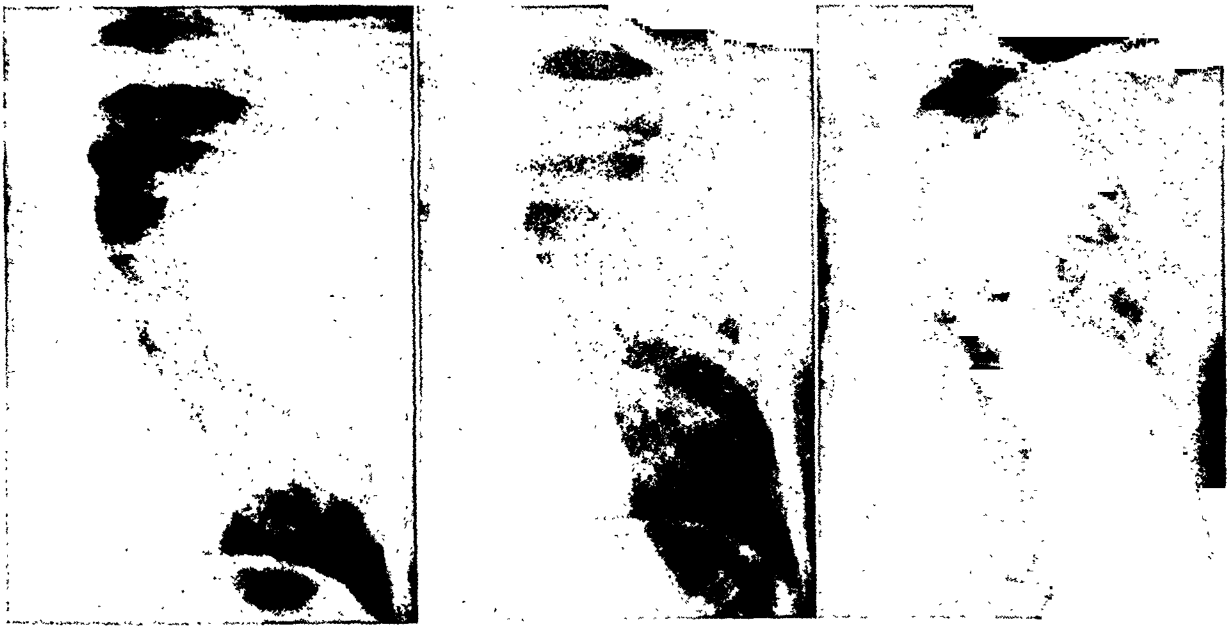

Fig. 1.—*Left*, a posteroanterior chest film taken at entry (sixth day of illness), disclosing homogenous density in left upper lobe. *Center*, considerable resolution on 15th day of illness, five days after chloramphenicol therapy was started. *Right*, continued but incomplete clearing of pneumonia of left upper lobe in film taken 32 days after onset of disease.

Q fever is caused by Rickettsia burneti. However, Q fever differs in many ways from the other rickettsioses. There is no distinguishing skin rash. Serums of patients convalescing from Q fever do not contain agglutinins for the Proteus species of the Weil-Felix test. Moreover, R. burneti is possessed of a tolerance to drying that is unique among the rickettsia. This environmental tolerance is likely associated with the epidemiology of Q fever.

It now appears that R. burneti is primarily a parasite of the tick. There is transovarial passage in the tick so that the association, tick-rickettsia, is not a mutually destructive one. Sheep, cattle, goats, and rodents are the usual mammalian extensions in habitat ventured by this micro-organism. Transmission to humans is a dead end for R. burneti, since human-to-human transmission does not occur. On the other hand, infection of domestic animals may lead to perpetuation and dissemination of mammalian parasitism, for R. burneti has been recovered from the milk of infected cows as well as from other secretions and excreta from a variety of infected animals.[2c]

For the most part, Q fever is clinically inapparent in sheep, cattle, and goats. However, there is serologic evidence that Q fever is spreading in cattle in the United States. In southern Idaho, spread has been noted particularly in dairy cattle [4b]; it remains to be seen whether an increase in human Q fever will follow.

Human Q fever is rarely, if ever, the result of a tick bite. The usual route of human infection is by inhalation of infected dust particles, for example, R. burneti–laden dust from detritus from hides or from wool.[6] Q fever in the human presents as an undifferentiated, or atypical, pneumonia. There are no characteristics which permit certain diagnosis on clinical grounds alone. Yet, with psittacosis, Q fever is remarkable for being a specifically treatable atypical pneumonia. Chloramphenicol, or one of the tetracyclines, will secure prompt amelioration of the disease, as demonstrated by the case reported here (fig. 2).

Course of Disease in Volunteers.—When untreated, the consequence of Q fever uncommonly is death but quite often is a significant morbidity. When studied in volunteers,[7] clinical Q fever resulted in 16 of 23 men exposed to various doses of aerosolized R. burneti (18 of these 23 men developed complement-fixing antibodies to Q fever). It must be kept in mind that Q fever induced in healthy young men by a laboratory strain of R. burneti may not be typical of the disease encountered in practice. For example, sudden onset of symptoms was not prominent and there were no instances of protracted disease (reported to occur in as many as 20% of patients with epidemic Q fever), of hepatitis, or of prolonged weakness and weight loss during convalescence in this volunteer study.[8] Yet, certain aspects of the clinical course in volunteers are of interest in that they probably refer to the situation in nature.

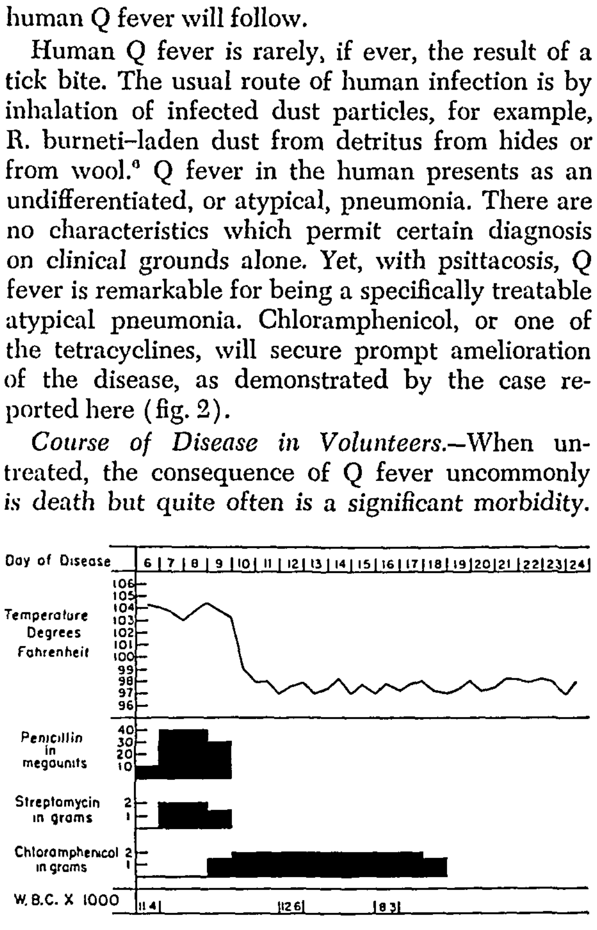

Fig. 2.—Graphic summary of clinical course of patient with Q fever. Dramatic defervescence and symptomatic improvement coincided with chloramphenicol therapy.

*Complement-Fixation Titrations of Patient's Serums with Antigens of Q Fever and Psittacosis**

Date of Serum	Day of Disease†	Titer‡ for Q Fever	Titer‡ for Psittacosis
Sept. 10	9th	0	0
Sept. 17	16th	0	0
Oct. 3	32nd	128	0
Oct. 31	50th	128	...

* Carried out by the Bureau of Laboratories, Utah State Department of Health, Russell S. Fraser, M.S., Chief.

† Day of onset of symptomatic disease taken as 1st day of illness (Sept. 1, 1958).

‡ Titer expressed as reciprocal of highest dilution of serum yielding 4+ reaction.

Thus, although in this volunteer study the inhaled dose of R. burneti was increased 1,500 times from the smallest infecting dose, the incubation period decreased concomitantly only from 17 to 10 days. Low-grade fever with lassitude and anorexia marked the clinical onset of the illness. Real chills were rare, but temperature usually rose during the afternoon to around 103 (39.4 C) by midnight. Headache was a common complaint. Relative bradycardia and/or splenomegaly were sometimes observed. Physical signs of pneumonitis were not striking. About one-half of the men with clinical illness developed roentgenographic evidence of pneumonitis around the third or fourth day of illness.

Differential Diagnosis.—Diseases which may, on clinical grounds, be confused with Q fever include bacterial pneumonias, influenza, adenovirus respiratory infections, psittacosis, and primary atypical pneumonia. With bacterial pneumonias the onset with rigor, pleurisy, and productive cough is of differentiating value. In addition, there is the appearance of the patient with compromised respiratory movements and cyanosis. Leukocytosis is commonly marked. The finding of a bacterial pathogen on culture of the sputum is confirmatory.

Influenza, typically of sudden onset, with fever, headache, and cough, mimics Q fever closely. Very likely, the category "influenza" is the nominal repository of most of the Q fever which must occur in Utah—over 7,000 cases of influenza were reported in Utah in 1958, a nonepidemic year.[9] While pulmonary infiltration is radiographically present in about 50% of the cases of Q fever, pneumonia is not a manifestation of uncomplicated influenza. Diagnosis of influenza can be accomplished by virus isolation (throat washings) or by examination of acute and convalescent serums for hemagglutination inhibition.

With isolation of the adenoviruses, it has become apparent that at least some of the cold agglutinin-negative, streptococcus MG-negative, primary atypical pneumonias are due to adenovirus infection. Types 4 and 7 have been associated with roentgenographic evidence of pneumonias, as well as types 1, 2, 3, and 18.[10] Virus isolation (throat washings, stool) and/or serologic studies (acute and convalescent serums) are required for diagnosis.

Adenovirus infection, psittacosis, and primary atypical pneumonia are often clinically indistinguishable from Q fever. While Q fever and psittacosis are curable with chloramphenicol or the tetracyclines, adenovirus infection and primary atypical pneumonia are not amenable to presently available anti-infectious agents. Psittacosis, while an uncommon cause of pneumonia, may be a severe illness. Diagnosis is ordinarily made by complement-fixation testing of acute and convalescent serums. The response to appropriate antibiotic therapy is a therapeutic trial that is of value in diagnosis. Primary atypical pneumonia is distinguished by engendering the production of cold agglutinins and/or agglutinins for streptococcus MG.

Diagnosis of Q fever by isolation of R. burneti has been accomplished by inoculation of blood, sputum, spinal fluid, and urine obtained during the acute, febrile stages of the disease into guinea pigs or embryonated eggs. However, the agent is so infectious to laboratory personnel that diagnosis by isolation is rarely justified. Commonly, diagnosis is retrospective and is accomplished by demonstration of a rise in serum complement-fixing antibodies specific for R. burneti; an increase from no detectable antibody in a serum specimen obtained during the acute illness to a titer of 1:32, or higher in serum collected about two weeks later (convalescent specimen), is diagnostic. A series of serums is required when antibiotic therapy has been instituted. With specific therapy there may be several weeks' delay in antibody response, so that a diagnostic rise will not be apparent until six to eight weeks after onset of illness.[7] The complement-fixing antibodies are highly specific and may persist for years.

Summary

A case of serologically proved Q fever occurred in a young man who works in a plant processing sheep hides. Although this is the second proved case of Q fever in Utah, serologic evidence indicates Q fever is of both widespread and frequent occurrence in the state.

175 E. 21st South St. (15) (Dr. Hoeprich).

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THE TEETH IN OLD AGE.—When examining the mouth, it should be remembered that the presence or absence of teeth is more vital than the presence or absence of infection. Dyspepsia is commoner in the toothless than in those whose oral state is foul. Removal of infected teeth in old people only occasionally coincides with a turn for the better. Many elderly folk never get used to dentures, so that possession of false teeth does not always indicate their use for mastication. Some natural teeth in the jaw are worth more than a denture taken out of the mouth before meals.—Trevor H. Howell, Some Clinical Signs In Old Age: Some Practical Points in Geriatrics and Gerontology, Ed. 2, H. K. Lewis and Co. Ltd., London, 1950.

CLINICAL EXPERIENCE WITH A NEW ERYTHROMYCIN DERIVATIVE, ERYTHROMYCIN PROPIONATE

REPORT OF ONE HUNDRED FIVE CASES

Ian M. Smith, M.D.
and
William H. Soderstrom, M.D., Iowa City

The effects of orally administered erythromycin propionate have been observed in 105 patients. Most of them took it four times a day or every six hours in one or two capsules containing 0.25 Gm., and in a few cases this medication was continued as long as two months. The diseases treated were particularly those caused by Staphylococcus aureus, and the series included cases of pustular acne, furuncles, carbuncles, and pyodermas. Good results were obtained in 98 patients, 10 of whom had previously failed to respond to other forms of chemotherapy. Only eight patients had side-effects such as anorexia or vomiting, and diarrhea occurred in but one patient. This derivative, erythromycin propionate, has the advantage over the parent compound in that it produces higher concentrations in the blood after oral ingestion.

Erythromycin has been found to be an excellent antibiotic with few serious side-effects.[1] In a number of studies it has compared favorably with penicillin and other antibiotics in its clinical effectiveness. Among the minor side-effects, nausea and mild diarrhea have been noted. A disadvantage to the use of this antibiotic, as with others, is that a number of resistant staphylococcic strains have been found in hospital-acquired infections. It is possible that some of these infections would be amenable to higher blood levels of the antibiotic.

A new derivative of this drug, erythromycin propionate,[2] produces high blood levels within half an hour after ingestion and peak concentrations approximately four times those obtained with erythromycin tablets.[3] This compound, a true ester, produces higher blood levels than the more loosely bound erythromycin stearate,[4] which behaves like the base. With greater absorption it is possible that the minor gastrointestinal upsets from residual drug in the intestines might be avoided. Serum levels are more predictable than the widely variable levels found with coated-tablet erythromycin therapy.[3c] A third advantage is the rapidity with which high serum levels are obtained after oral medication.[5] A comparison of the antibacterial spectrum of erythromycin propionate with that of the parent compound has shown them to be identical.[6]

Acute and chronic toxicity studies in mice and rats have disclosed no pathological findings after large doses of the new ester. Higher serum levels are obtained in animals with the ester than with the erythromycin base because of its limited excretion in bile.[3a] In man very little degradation of the ester takes place in the body, as 80% of the erythromycin excreted in the urine is unchanged erythromycin propionate.[3a]

This paper deals with our clinical experience with erythromycin propionate in a variety of diseases, particularly those caused by Staphylococcus aureus.

Materials and Methods

Selection of Patients.—From July, 1958, to December, 1958, erythromycin propionate was given to patients seen in consultation by one of us (I. M. S.) and in the medical, dermatological, and orthopedic wards of the University Hospitals. Some patients were treated in the dermatology out-clinic and student health department. With the exception of some of the latter two groups, all patients had a routine physical examination, blood cell count, and urine examination. Forty-nine patients had a blood cell count after treatment with the drug. The group of patients was composed of 59 males and 46 females who ranged in age from 6 to 89 years. The 37 hospital inpatients were seen daily to evaluate the clinical response and to note side-effects. Follow-up cultures were taken where indicated.

Bacteriological Studies.—Blood, sputum, urine, and other cultures were done in either the routine bacteriological laboratory or the laboratory of the infectious disease division. Both the incorporation of antibiotics in blood agar plates and the disk method of performing sensitivity tests were used (see table). Cultures were obtained from all but five of our patients.

Therapeutic Regimen.—Erythromycin propionate was given orally in capsule form, 0.25 or 0.5 Gm. four times a day or every six hours in most cases.

From the Infectious Disease Division, Department of Internal Medicine, College of Medicine, State University of Iowa, and the University Hospitals. Dr. Soderstrom is a Staff Physician at the Veterans Administration Hospital.

Therapy was continued for a median period of six days, but in a few cases it was given for as long as two months.

Results

Pustular Acne.—Seven patients, aged 16 to 24 years, had clinical diagnoses of acne. Staph. albus was cultured from the lesions in four and Staph. aureus in two, with no growth from one patient's lesions. The therapy varied considerably: on the average 250 mg. three times a day was followed in four days by a period of the same dose twice daily for one to two weeks and then long periods with 250 mg. once daily. All the patients, with one exception, showed improvement. The one exception was a girl who developed nausea and vomiting after taking 1 Gm. of the medicament; it was then withdrawn. We feel that a more vigorous therapeutic regimen would be more successful in a shorter period of time.

Furuncles.—Twelve patients with bacteriologically confirmed furunculosis were treated for an average of seven days with 250 mg. of erythromycin propionate, given four times a day, with improvement in all. Three patients, however, had a recurrence of their boils, and in one case the staphylococci previously sensitive to erythromycin were now resistant. In three cases incision and drainage was necessary. Three other patients received, concurrently, intranasally given bacitracin.

Carbuncles.—Four men were treated for carbuncle with an average dose of 18 Gm. over a 14-day period. Two carbuncles had to be drained. All the patients did well and were apparently cured.

Stasis Ulcers Infected with Staphylococci.—Five patients (including two diabetics) with stasis ulcer (all were females aged 69-81 years) were treated with 10-25 Gm. of erythromycin propionate over a 10-to-25-day period. There was a clinical and bacteriological cure in four patients and marked improvement in one. Pinch grafting was also done in two. Two days after a 10-day course of therapy with the erythromycin derivative, one patient died after hematemesis. A postmortem study was not done. A detailed case history of this patient is presented below.

Miscellaneous Staphylococcic Pyodermas.—Eighteen patients, including three with postoperative wound infections, two with impetigo, and two with paronychia, were treated with 4 to 56 Gm. of erythromycin propionate over a 3-to-42-day period. There were 14 patients with clinical cures and 2 with improvement, both of whom had pyoderma gangrenosum and required prolonged topical and systemic therapy. One of the patients with paronychia had tularemia with secondary staphylococcic involvement; this case is discussed below.

Osteomyelitis.—An 8-year-old boy with acute osteomyelitis of the metaphysis of the right fibula and a subcutaneous abscess did well with surgical treatment followed by therapy with erythromycin propionate given four times a day for three weeks. Three women and three men with chronic osteomyelitis showed considerable improvement with an average treatment of 39 Gm. of erythromycin propionate over a 28-day period. (All but one of these patients had operative drainage as well.) As at least a two-month period of follow-up study has elapsed in five of these patients without recurrence, it is tempting to call them cured; at least the disease is arrested. One patient showed relapse four months after the end of treatment.

Staphylococcic Pharyngitis.—In three girls and five men, aged 18 to 31, acute pharyngitis was present and culture medium inoculated with throat swabs grew pure cultures of coagulase-positive hemolytic Staph. aureus. All these patients were treated with 250 mg. given four times a day for an average of four days, and all recovered uneventfully from their acute pharyngitis. One 26-year-old girl complained of mild drowsiness for three days with a feeling of drawing-in around the mouth and swelling of the eyes. There was no swelling of the eyes on examination, and the subjective feelings disappeared while the medication was continued.

Antibiotic Sensitivity of Strains of Staphylococcus Aureus Isolated from Patients

	% of Strains Resistant to				
Strains Tested, No.	Penicillin (1 and 10 Units/Cc.)	Streptomycin (5 and 50 Mcg./Cc.)	Tetracycline (5 and 50 Mcg./Cc.)	Chloramphenicol (5 and 50 Mcg./Cc.)	Erythromycin (1 Mcg./Cc.)
32	62.5				
31		35.5*			
29			48.3		
24				0†	
32					12.5

* 16.5% of the strains were only sensitive to 50 mcg./cc.
† 80% of the strains were only sensitive to 50 mcg./cc.

Streptococcic Pharyngitis.—Fourteen patients (seven males and seven females) with streptococcic pharyngitis were treated with an average dose of 7 Gm. of erythromycin propionate over a six-day period. All were cured without any side-effects. One patient had to discontinue treatment because of nausea and two or three loose stools daily.

In two further cases of pharyngitis no pathogenic bacteria were isolated. In one patient this therapy was discontinued after one day because of nausea and vomiting. Both patients recovered without other side-effects.

Pulmonary Infections.—In six patients with purulent bronchitis, Staph. aureus (2), beta hemolytic streptococci (1), and normal flora (3) were isolated from the sputum. All of them improved on an average dose of 8 Gm. of the antibiotic given for seven days. One patient had a residual dry cough. There were no side-effects.

Three patients with pneumonia were cured (one case due to Pseudomonas aeruginosa and two to Staph. aureus). One patient complained of epigastric distress. In one other patient, however, the pneumonia was a complication of bronchogenic carcinoma. He improved temporarily with treatment. A 45-year-old woman who had staphylococcic empyema complicating a preceding Escherichia coli empyema was much improved after 35 days of treatment with 2 Gm. daily. A 29-year-old woman with bronchiectasis and pansinusitis infected with beta hemolytic streptococci showed no change after two weeks' treatment, but she had anorexia and anxiety.

Sinusitis.—Three patients with chronic sinusitis were improved (one case each due to Staph. aureus, Staph. albus, and Diplococcus pneumoniae). Two of them had preceding infections with Candida albicans. One, with intestinal infection, had no exacerbation of his diarrhea while he took the medicament along with nystatin (Mycostatin). The other, a 41-year-old multipara, had vaginitis which increased slightly while the medicament was given despite use of nystatin suppositories. After a break in therapy, for this reason, further treatment led to increased improvement in the sinusitis. Later treatment with tetracycline, however, produced still more improvement in this chronic pneumococcic sinusitis. These patients had an average dose of 21 Gm. of erythromycin propionate over a 16-day period.

Miscellaneous.—In addition, four patients were treated with the ester but assessment of their results was complicated by the concurrent use of chloramphenicol or novobiocin. All but one of them were cured, and none had side-effects. One patient, a 64-year-old woman with a left frontal abscess caused by Staph. albus, did not improve. The organisms proved to be resistant to erythromycin, and she showed improvement on tetracycline therapy.

An interesting group of five patients was treated initially with an average of 5 Gm. of erythromycin base and was then switched to therapy with erythromycin propionate. Several preferred the propionate form of the drug over the enteric coated base because they were free from abdominal discomfort. Three other patients who had taken the erythromycin base in the past expressed the same preference. All the patients switched to therapy with erythromycin propionate were cured without side-effects.

Side-effects.—The over-all impression was that patients on therapy with this drug were remarkably free of discomfort and there were no serious side-reactions to worry the physician. No superinfection was found, except possibly a mild exacerbation of an already present vaginitis due to C. albicans. No allergic phenomena, such as skin eruptions, pruritus, anaphylaxis, or asthma, were seen. None of the patients developed clinical evidence of bone marrow damage. In 49 patients blood cell counts after therapy were normal. There was no clinical or laboratory evidence of interference with liver or renal function. No patients complained of deafness or vertigo. No drug fever was found.

Gastrointestinal side-effects were minor in degree. Four patients complained of anorexia, nausea, or vomiting, but in only two was it necessary to stop the drug therapy. Two other patients complained of epigastric distress; one experienced it particularly with his evening and early morning doses taken on an empty stomach. Both, however, were successfully treated. Two patients had two or three loose, brown, watery stools daily. We stopped treatment in one because of this; the case of the other is reported in detail below. In one case fatal hematemesis occurred two days after the end of a 10-day course of erythromycin propionate therapy. This is reported in case 3.

Report of Cases

Case 1.—A 29-year-old *veterinarian* had an *acute exacerbation of a chronic sinusitis* associated with acute laryngitis. He was coughing up a moderate amount of purulent sputum and had vague respiratory distress. Apart from purulent nasal discharge and sputum, physical examination was normal. A heavy pure growth of Staph. albus was obtained from the sputum and nasal swabs.

Because of a misunderstanding, he took 750 mg. of erythromycin propionate four times daily for three days. This caused diarrhea with gaseous, loose, watery, brown stools three times daily. After two days off the drug therapy he resumed treatment with 500 mg. four times a day without further distressing side-effects. The laryngitis, bronchitis, and sinusitis responded promptly to treatment.

Case 2.—A 24-year-old physician when out hunting found a sick rabbit at the side of the road. He killed it and later dissected it along with five other rabbits, and none had any sign of disease. Three days later he developed axillary lymphadenopathy with chills and fever. In one or two days he noticed painful subungual lesions, from which pus could be expressed, on his thumb and ring finger. From the third day after exposure until the fifth day he took 250 mg. of tetracycline four times a day and felt improved except for the local lesions on the fingers. Fourteen days after exposure he developed *fever and axillary pain for a second time.* Two days later his titer against Pasteurella tularensis was 1:80; nine days later it was 1:640; and a further seven days later it was 1:2,560. At the time of the relapse the finger lesions were secondarily infected with Staph. aureus resistant to erythromycin, penicillin, streptomycin, and tetracycline and sensitive only to high doses of chloramphenicol or novobiocin. This report was unfortunately mislaid, but the lesions healed rapidly when 500 mg. of erythromycin propionate was given four times a day for five days. On this medication the axillary adenitis and malaise disappeared. It is possible that his tularemia was cured. The patient was given the choice of continuing the erythromycin propionate therapy or switching to an agent of known antitularemia potency. He decided to stop the erythromycin propionate therapy and received streptomycin intramuscularly, 1 Gm. twice daily for two days and 0.5 Gm. twice daily for five days. During this period he returned to his work. Two days later subungual pus reappeared in the thumb. The strain isolated on this occasion had the same antibiotic sensitivities as the previous one. A further two days later he developed a nasal furuncle associated in eight hours with spreading cellulitis of the left maxillary area with swelling particularly in the infraorbital region. He was afebrile. He was readmitted to the hospital and treated with 500 mg. of chloramphenicol four times a day and 250 mg. of novobiocin four times a day. The first drug was given for 4 days and the second for 10 days, and intranasally given bacitracin was used concurrently. He recovered uneventfully.

Case 3.—A 74-year-old housewife fell and broke her hip. She was admitted to a local hospital and on the second day was febrile and mildly confused. On the third day she was admitted to the University Hospitals and closed reduction of her left hip was done. History-taking was difficult because of the patient's confusion. She was noted to have sinus tachycardia confirmed by electrocardiogram and to have a rectal temperature of 102 F (38.8 C). There was slight cardiac enlargement but no evidence of cardiac failure. Circulation time and venous pressure were normal. A varicose ulcer was present, and a culture showed hemolytic Staph. aureus resistant to penicillin and sensitive to erythromycin, tetracycline, and high levels of chloramphenicol or streptomycin. On the third day of her admission her temperature was 102.6 (39.1 C) rectally. She was treated with 250 mg. of erythromycin propionate given every six hours. While receiving this treatment over a 10-day interval, her varicose ulcer healed but she remained febrile with a leukocytosis. She continued to have tachycardia with hyperpnea and was disoriented but had no localizing neurological signs. Her tachycardia did not respond to digitalization. Two days after discontinuing her antibiotic therapy she vomited 300 cc. of coffee-ground vomit and died shortly thereafter. This patient died of an undiagnosed illness, and we are unable to say what part the antibiotic might have played in the hematemesis.

Case 4.—A 73-year-old woman was transferred to the University Hospitals from another hospital. Six months previously she had received a Whitman's arthroplasty for osteomyelitis. At the time of admission she had an abscessed hip and lobar pneumonia. Staph. aureus resistant to penicillin and sensitive to erythromycin, streptomycin, tetracycline, and a high concentration of chloramphenicol was isolated from the hip abscess and from the sputum. She improved steadily on therapy with 250 mg. of erythromycin propionate given four times a day over a 47-day period.

Case 5.—A 35-year-old laborer had had a history of chronic osteomyelitis since the age of 15. Nine days prior to admission at this hospital on Oct. 8, 1958, the patient developed pain in the anterior part of the left thigh. This was treated at his local hospital with rest and antibiotics without improvement. Physical examination on admission showed the left leg 4 in. shorter than the right, fusion of hip in 150 degrees flexion, and a 0.5-cm. deep sinus tract over the left greater trochanter. Treatment consisted of bed rest and novobiocin, 250 mg. every six hours for one week, and he was discharged on Oct. 15, 1958, improved.

Shortly after discharge the patient developed pain over the medial condyle of the left femur without joint pain. He was readmitted on Oct. 30, 1958. Physical examination at this time revealed local tenderness over the condyle with some inflammation and a temperature of 101.2 F (38.4 C). X-ray examination showed bony destruction of the affected area. The patient was treated with chloramphenicol and penicillin with transient subjective improvement. Three days after admission his temperature rose to 103.4 F (39.6 C). A greatly swollen knee, containing pus, developed, and culture showed hemolytic Staph. aureus sensitive to erythromycin, penicillin, streptomycin, tetracycline, and chloramphenicol at high levels.

An arthrotomy was done with instillation of triple sulfonamides. The patient continued to receive chloramphenicol with triple sulfonamides for two days with a slight improvement in his fever. Two days after the arthrotomy, chloramphenicol therapy was discontinued and that with erythromycin propionate was started with 500 mg. every six hours; triple sulfonamide treatment was continued an additional two days. On Nov. 10, 1958, a decompression osteotomy and drainage of the intramedullary canal was done. After this the patient became afebrile with good wound healing and minimal drainage. Twenty-six days after the start of therapy with the erythromycin derivative it was discontinued because of epigastric distress. Four days after this a low-grade temperature elevation was noted for four days. A reculture of the sinus drainage again grew hemolytic Staph. aureus; the sensitivities were unchanged. The patient was placed in a hip spica and discharged on therapy with erythromycin propionate, 500 mg. every six hours for five days. At the time of writing he is well.

Comment

Erythromycin propionate is useful in treatment of a number of common infections and has been effective in treatment of a number of less common and more serious infections. In our hands it has been particularly helpful in the treatment of staphylococcic disease. As its spectrum covers staphylococci, streptococci, and pneumococci, it should be useful in general practice.

Studies done by others have revealed early and predictably high levels of the antibiotic in the blood after oral administration. In our experience therapeutic success has been more consistent with this compound than with the parent erythromycin. Patients complain less of minor side-effects. Diarrhea occurred only once in our series, if one omits the case of overdosage. This is considerably less than the 7.6% reported with erythromycin base.[1b] The lack of superinfections is an additional benefit.

Several of the patients with furunculosis responded well to the treatment initially but later showed relapse. We have referred elsewhere[7] to the "ping-pong-like" transfer of staphylococci from carriers in the family group or from carriage areas in the patient and believe that these recurrences are due to an ignorance of this fact.

Patients with osteomyelitis often require prolonged treatment. This new drug appears to be useful for the treatment of this disease. The 74-year-old patient who died with hematemesis was already seriously ill and disoriented with fever, tachycardia, and hyperpnea of undiagnosed etiology. In the absence of an autopsy it would be unfair to attribute the hematemesis to the drug alone, although the aggravation of a preexisting lesion appears quite possible.

Summary

Erythromycin propionate was used in the treatment of 105 patients with a variety of common infections. Sixty-four patients had Staphylococcus aureus infections and 16 had beta hemolytic streptococcic infection. The remainder were caused by a variety of organisms. Good results were obtained in 98 patients (94%). Ten of them had previously failed to respond to other forms of chemotherapy. The strains of bacteria that were isolated were resistant to the drug after treatment in only two patients.

The average duration of treatment was 12 days, with a range of from 1 to 55 days. The highest dose given was 70 Gm. over a 35-day period. No cases of fungus or staphylococcic superinfection of the alimentary tract were found. The only side-effects were anorexia, nausea, vomiting, or diarrhea, one or other of which occurred in 7.6% of the patients. Diarrhea occurred in less than 1%. In only three cases was there any need to discontinue therapy because of the side-effects. There were no fatalities definitely attributable to the drug. We did not find any hypersensitivity or clinical or laboratory evidence of bone marrow, liver, or renal damage. In one patient a fatal hematemesis, not believed to be the result of the treatment, occurred two days after the end of a course of therapy. The drug is considered to be useful and convenient in treatment of a number of common infections.

This study was aided, in part, by a grant from Eli Lilly & Company, Indianapolis. The erythromycin propionate used in this study was supplied as Ilosone by that company.

Miss Marion Jones, M.Sc., supplied the reports from the bacteriological laboratory. Drs. Mary E. Godfrey, Ellia Ch. Hazard, William B. Bean and staff, L. Boulware, Carroll B. Larson and staff, Chester I. Miller, Chris E. Redcliffe, and P. C. Stivrins aided in this study.

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CLINICAL NOTES

EWING'S SARCOMA OF THE TOE

Albert R. Andrisek, M.D., Cleveland

A review of the literature regarding Ewing's sarcoma indicates that tumors located in small bones are apparently a rare finding. In 75% of cases, long bones of the extremities, including the shoulder girdle, were involved; lower extremities were involved in 50% of cases. The predilection for metaphysis in long bones was noted. In the series reported by McCormack, Dockerty, and Ghormley[1] no cases of phalangeal tumors are reported. In a study of 424 primary malignant tumors of the bone, Meyerding[2] found that Ewing's sarcoma of all bones constituted approximately 27%.

The condition is rare. At the Mayo Clinic, primary bone tumors occur in about 1 in 10,000 patients. The only case seen in a phalanx of the toe is reported by Geschickter (tumor of bone, 1930). He mentions a few that were located in the tarsus and metatarsus. There is a report[3] of Ewing's sarcoma of the cuneiform bone in a 14-year-old boy, who remained well for two years after amputation below the knee and finally developed pulmonary metastases. No other cases of Ewing's sarcoma in small bones could be found in the medical literature since 1945.

Ewing's sarcoma is a disease of childhood and adolescence; more than half of the cases occur in persons under 20 years of age and 80% in persons under 30 years of age. Males are affected twice as often as females. The onset of this disease is insidious; aching, boring pain is generally the first symptom. The pain rapidly increases in persistence and severity, being accentuated during rest. Roentgenologic findings are not as typical or diagnostic as some of the literature might lead one to expect.

Report of a Case

A 20-year-old male was seen for a routine examination on Sept. 24, 1954, at which time he complained of pain and redness of the large toe, right foot, which had been present for about two weeks. He thought he might have stubbed the toe but was not certain. He admitted having partaken in some beer drinking and wondered if he might not have gout.

The patient's history included the usual childhood diseases, ruptured appendix, and tonsillectomy. Physical findings on examination were essentially negative, except those of the large toe, which appeared reddened and tender under pressure, with some swelling and apparent induration. An x-ray of the toe (fig. 1), on Sept. 24, showed dense proliferation of the proximal phalanx. X-rays of the hands, left foot, pelvis (both hip joints), and chest were negative. The laboratory report showed uric acid level, 6.2 mg. per 100 cc.; hemoglobin level, 15.0 Gm. per 100 cc.; white blood cell count, 6,700 per cubic millimeter; and differential count within normal limits.

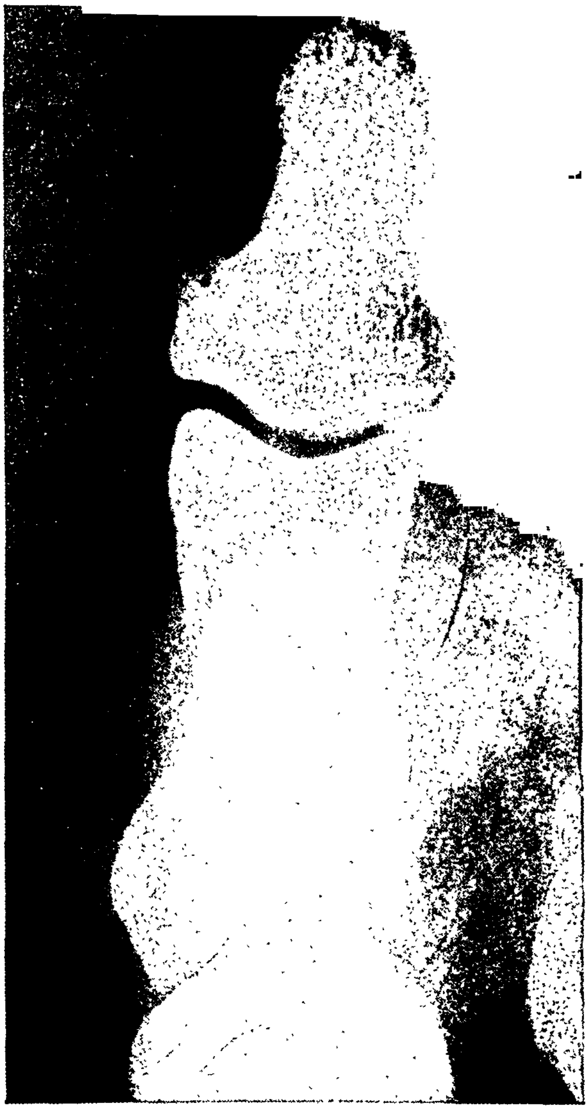

Fig. 1.—X-ray of right great toe, showing dense periosteal proliferation of proximal phalanx.

From St. Vincent's Charity Hospital.

A biopsy (fig. 2) was done on Oct. 6, 1954. Grossly the tissue fragments varied from 0.5 to 2 cm. in greatest dimension. They were light tan to gray and sectioned with moderate resistance. The cut surfaces were smooth and glossy. Some of the fragments were friable and soft.

Microscopic sections revealed thick anastomosing cords and sheets of small cells forming broad collars around small vascular spaces. The cells were fairly uniform in size, shape, and staining quality. They displayed scanty pale pink to stainless cytoplasm with indefinite cell borders. The nuclei were prominent, oval to round, and occasionally irregular. They varied slightly in staining quality but in general were pale with somewhat darker borders. Occasional nucleoli were identified, and mitotic figures were not infrequent. The cells were compact in some areas but more loosely arranged in others. While they surrounded vascular spaces, they did not encroach on the walls of the blood vessels, whose lumens were free of tumor cells. Formations of fibrous septums occasionally gave the tumor an alveolar appearance.

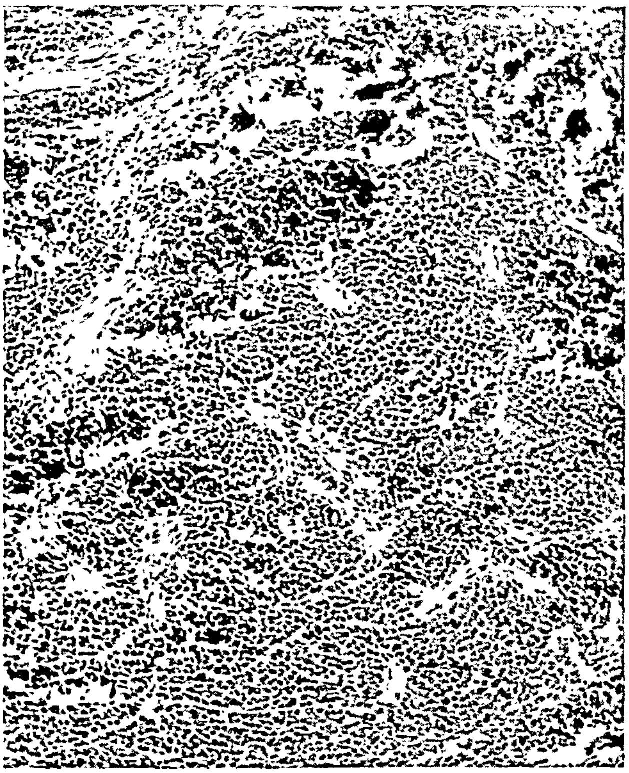

Fig. 2.—Biopsy specimen of proximal phalanx of right great toe.

Decal sections showed thick bony trabeculae surrounded by fibrous tissue infiltrated by loosely arranged nests of tumor cells. Occasional cells infiltrated marrow spaces which were undergoing fibrosis. No multinucleated giant cells of tumor origin were identified. A diagnosis of Ewing's sarcoma was made.

Disarticulation of the proximal phalanx with removal of one-third of the metatarsal was done on Oct. 11, 1954.

On Feb. 2, 1955, the patient complained of pain in right groin and over the right femur anteriorly. X-rays taken on Feb. 22, 1955, were negative. X-rays taken on June 18, 1955, showed metastasis to the right hip joint and left ribs (fig. 3 and 4). On June 24 palliative x-ray therapy (250 kv. to th right hip and ribs) was begun; it was continued to Oct. 3 1955, with a partial response and with decrease in the siz of the lesion and some alleviation of pain. On Jan. 8, 1956, metastasis to the left temperoparietal bones was noted. On Jan. 13, 1956, the patient died.

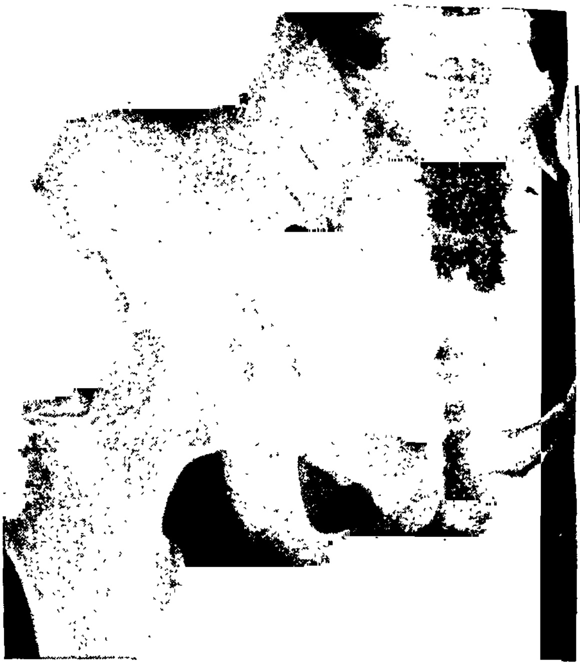

Fig. 3.—X-ray showing metastasis to right hip.

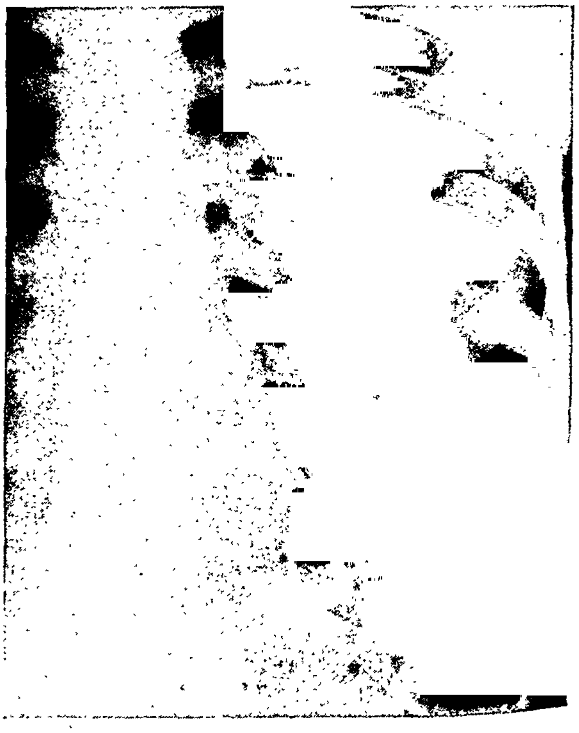

Fig. 4.—X-ray of chest, showing metastasis to ribs.

Comment

Since the etiology is obscure and the disease is primarily of childhood, youth, and early adult life, rarely seen in persons over the age of 25, the clinical features of pain, variable in intensity with a lump or swelling, can be confused with a bone infection.[4] Primary bone sarcoma of a phalanx is so rare as to be considered almost nonexistent.[5] Unfortunately, despite the control of the primary tumor, metastases nearly always develop later. Though these in turn yield to treatment, the patient dies during the continuing hopeless struggle to keep up with the widespread disease by radiation therapy. The progress of the disease varies markedly, being exceedingly rapid in some cases while in others a fatal termination may be long deferred. The average life expectancy is usually less than two years.

Summary

A case of Ewing's sarcoma has occurred, with reactive bone formation in sun ray pattern as seen in figure 1. An extensive but incomplete survey of the literature has disclosed only one case of Ewing's sarcoma of the phalanx, reported by Geschickter. Metastasis is rapid, with death occurring between two and five years after onset of the disease.

2939 Woodhill Rd. (4).

Dr. E. J. O'Malley assisted with x-ray interpretation and therapy in this study. Dr. Wm. Hoffman made pathological interpretations and studies, and Miss E. Slusarczyk assisted with the statistical analysis.

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PERICARDITIS IN ASSOCIATION WITH CHICKENPOX

Theodore Mandelbaum, M.D., Rockville Centre, N. Y.
and
Byron H. Terk, M.D., Hempstead, N. Y.

The occurrence of pericarditis in association with acute infectious disease is not uncommon and has been reported frequently in the past decade.[1] Griffith and Wallace,[2] in 1953, reported on the etiology of pericarditis and recorded 15 different causes for this disease; the highest percentage (15.8) of cases is classified as being due to idiopathic disease. They make no mention of chickenpox (varicella) as a causative agent. In other reports,[3] a relationship between viral disease and pericarditis of the so-called benign nonspecific type has been definitely established. Up to now, there have been no reports in the literature showing the coexistence of pericarditis with chickenpox; however, the presence of myocarditis with chickenpox is not unknown. Hackel[4] described seven cases of chickenpox ending fatally in which the autopsy reports showed myocarditis not suspected clinically. Epicarditis also was demonstrated to a moderate degree in six of these cases. It is therefore considered of interest to report the following case, which appears to be clinically typical of acute benign pericarditis occurring during the course of an illness diagnosed as chickenpox.

Report of a Case

A 33-year-old male was admitted to Meadowbrook Hospital with a two-day history of malaise and fever, and a 12-hour history of headache, photophobia, and skin eruption. The eruption was first noted on the head and almost simultaneously on the face, neck, and upper extremities. There were no other systemic or local symptoms. The patient's son had had chickenpox three weeks prior to the present illness. The patient had never had chickenpox and had been vaccinated twice for smallpox, once as a child and once while he was in the armed services, in 1943.

On his admission to the hospital, the patient's temperature was 102 F (38.9 C); he was uncomfortable but in no acute distress. The skin was the site of a macular, papular, vesicular, and rarely pustular rash in all stages of development. This rash was present on the scalp, face, arms, legs, and torso.

From the Division of Internal Medicine, Meadowbrook Hospital, Hempstead, N. Y.

The lungs were clear to auscultation and percussion. The heart was not enlarged; there were no murmurs or thrills. The remainder of the physical examination was not remarkable.

Treatment initially was only symptomatic. The temperature continued to be elevated to approximately 101 F (38.3 C), and the clinical course was uneventful until the second hospital day, at which time he suddenly complained of severe aching pain in the left anterior part of the chest, with radiation to the back, neck, and upper part of the left arm. Extreme restlessness without diaphoresis or cyanosis soon appeared. The pain was not increased by respiration or motion. The pulse was 70 beats per minute; the blood pressure was 130/90 mm. Hg. The heart sounds were somewhat distant, but murmurs or friction rubs were again not discernible. The lungs were clear to auscultation and percussion. There was no local muscular tenderness. An electrocardiogram taken shortly thereafter revealed regular sinus rhythm, elevation of the S-T segments in leads 2, 3, and aVF, and depressed S-T segments in aVR, aVL, V_1, and V_2, with inverted T waves in V_1, V_2, and V_3 (fig. 1). Following the onset of these symptoms, the blood pressure dropped to a low of 80/50 mm. Hg during the next six hours but subsequently rose to 100/60 and remained elevated until the patient's discharge. An electrocardiogram taken 18 hours later showed a return to normal of the S-T segments. The patient had a similar attack of pain on the third hospital day, at which time a third electrocardiogram was made.

A chest film revealed the aorta arching to the right, which was confirmed by barium swallow, but otherwise there was no enlargement or other abnormality. The white blood cell count ranged from 6,000 to 6,400 per cubic millimeter on the first, second, and fourth hospital days. After initial polymorphonuclear cytosis, the remaining white blood cell counts revealed lymphocytosis. The sedimentation rate was 17 mm. per hour on the second hospital day and 35 mm. on the fourth hospital day. The fasting blood sugar level was 86 mg. per 100 cc., the cholesterol level 196 mg., and the blood urea nitrogen level 16 mg. Serial electrocardiograms show the progressive changes one would expect to find associated with an acute pericardial disease. Figure 2 is a tracing taken after the second attack and shows T-wave changes further suggesting the presence of localized pericarditis. The tracing done three days after this one showed definite retrogression of the previous findings (fig. 3), and the final electrocardiogram, taken seven weeks later, shows a complete return to normal.

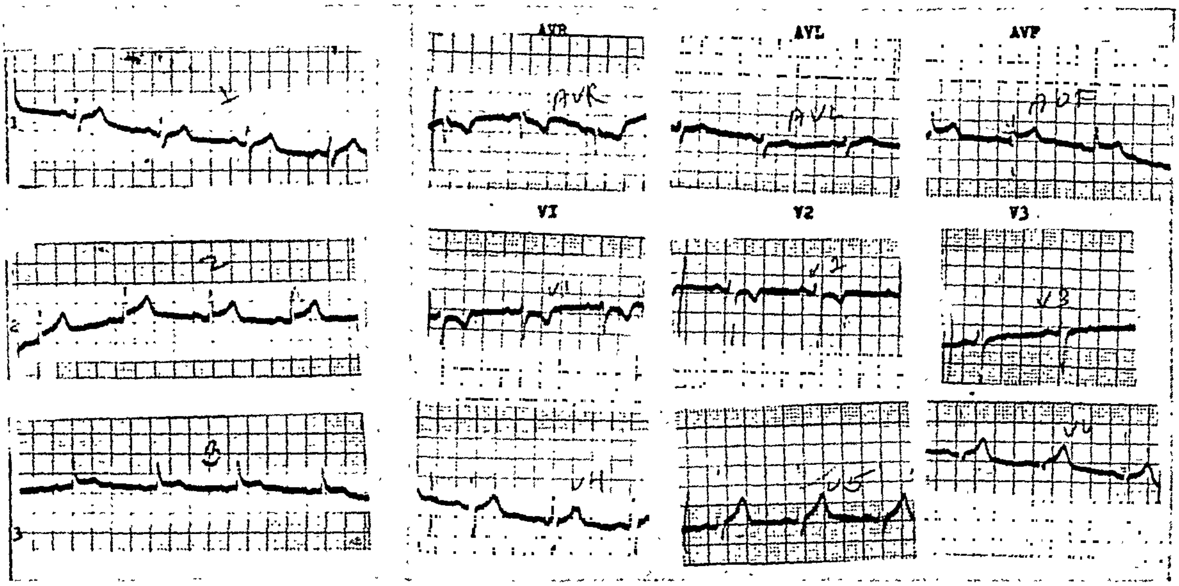

Fig. 1.—Electrocardiogram taken at onset of precordial pain, showing S-T and T-wave changes compatible with diagnosis of acute pericarditis.

The patient had become afebrile and insisted on signing his release on the eighth hospital day. He reported once more to the clinic seven weeks after his discharge, and his course has not been followed since.

Comment

This case is a classic one of chickenpox, with a typical history of exposure to that disease, the subsequent development of the characteristic exanthema, and the final retrogression of all signs and symptoms. However, shortly after the onset of the rash and fever the patient developed sharp chest pains, further increasing malaise, a decreasing blood pressure, and electrocardiographic changes interpreted as being those associated with pericarditis. A recurrence of his complicating discomfort reappeared in two days, with additional confirmatory electrocardiographic findings; such recurrence is not uncommon with viral (benign) pericarditis and has led to the use of the term "acute relapsing pericarditis."[1e] The rather rapid and relatively complete disappearance of all evidences of pericarditis is an expected result. Although this case did not present all of the classic phenomena that occur with so-called viral pericarditis, there appear to be enough changes to establish this diagnosis: the typical clinical course as manifested by the nature of the complaints, its acute onset, its subsidence, and its recurrence associated with the characteristic electrocardiographic changes. The fact that a friction rub was not heard and that cardiac enlargement was not noted merely suggests that the pericardial involvement was not of sufficient degree to produce pericardial effusion. The absence of changes in the quality of the heart sounds or in the rhythm indicates that myocarditis was not present to any detectable or significant degree.

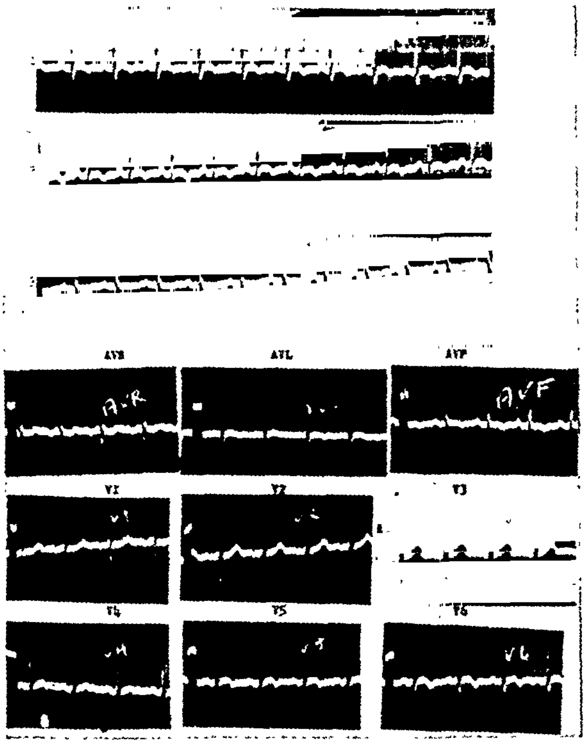

Fig. 2.—Electrocardiogram taken following second attack of precordial pain, showing even more pronounced T-wave changes.

Despite the frequency of the occurrence of pericarditis in relationship to acute infectious diseases, including those of so-called viral origin, it is interesting that no clinical cases of chickenpox pericarditis have been previously reported. It must be presumed that the association of these two phenomena is not unexpected; this has been demonstrated pathologically by Hackel.[4]

Usually acute pericarditides have been described as being the result of the primary inflammatory condition. Congenital abnormalities apparently may occur as a fortuitous circumstance and do not predispose to the appearance of a complicating inflammatory process involving the heart or surrounding structures. It is therefore felt that the arching of the aorta to the right described in this individual probably has no direct or indirect bearing on the occurrence of the acute disease as reported in this case.

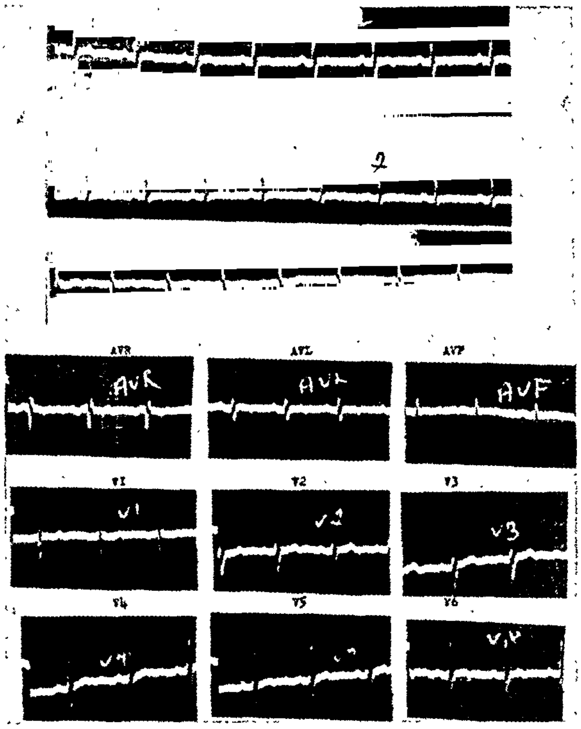

Fig. 3.—Repeat tracing done three days after last occurrence of precordial pain, showing less-pronounced T-wave changes.

Summary

In a case of acute benign pericarditis in association with chickenpox, the chickenpox was of classic course and was complicated only by the appearance of pericarditis of approximately four days' duration, with electrocardiographic changes lasting over a period of at least one week. The resolution was found to be complete on the examination done seven weeks after the onset of the acute illness.

165 N. Village Ave. (Dr. Mandelbaum).

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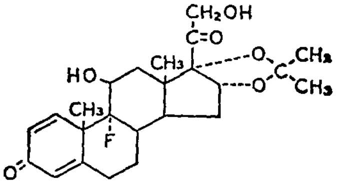
COUNCIL ON DRUGS

NEW AND NONOFFICIAL DRUGS

The following descriptions of drugs are based upon available evidence and do not in any case imply endorsement by the Council.

H. D. KAUTZ, M.D., *Secretary.*

Triamcinolone Acetonide (Kenalog).—9α-Fluoro-16α, 17α-isopropylidenedioxy-Δ^1-hydrocortisone.—The structural formula of triamcinolone acetonide may be represented as follows:



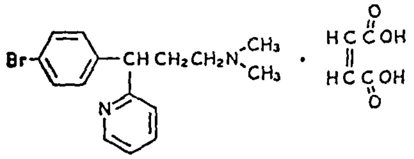
Actions and Uses.—Triamcinolone acetonide, a ketal derivative of triamcinolone, is a highly potent synthetic glucocorticoid which was introduced in 1958 for topical use in the treatment of certain acute or chronic dermatoses. It is effective in much smaller doses than those required with hydrocortisone acetate and shares the same relative freedom from untoward local and systemic effects. The drug is useful for the control of many common dermatoses, allergic and inflammatory, especially those associated with pruritus. Among these are atopic and contact dermatitis, neurodermatitis, seborrheic dermatitis, nummular eczema, eczematous dermatitis, exfoliative dermatitis, anogenital pruritus, and pruritus with lichenification. The drug may also be of value in relieving itching and burning associated with insect bites. Although it has occasionally proved beneficial in the management of eczematized psoriatic lesions (e. g., intertriginous psoriasis), the evidence to date does not suggest any consistent effect in chronic lichenified psoriatic lesions.

With the usual therapeutic doses systemic steroid effects have not been observed. Local irritation has rarely occurred, and, when it has, it may have been due to the vehicle in which it was incorporated rather than to triamcinolone acetonide per se. As with other steroid compounds, the drug should not be applied to infected areas of skin unless appropriate topical or systemic antibiotics are used concomitantly.

Dosage.—Triamcinolone acetonide, in concentrations of 0.1%, is applied topically to the affected areas two or three times daily.

Preparations: cream 0.1%; lotion 0.1%; ointment 0.1%. E. R. Squibb & Sons, Division of Olin Mathieson Chemical Corporation, cooperated by furnishing scientific data to aid in the evaluation of triamcinolone acetonide.

Brompheniramine Maleate (Dimetane).—2-[*p*-Bromo-α-(2-dimethylaminoethyl)benzyl]pyridine maleate.—The structural formula of brompheniramine maleate may be represented as follows:



Actions and Uses.—Brompheniramine maleate, introduced commercially in 1958, is a potent antihistaminic agent with actions and uses similar to those of chlorpheniramine maleate, to which it is chemically related, the difference being the substitution of a bromine atom for the chlorine atom of the latter compound. (See the monograph on chlorpheniramine maleate and the general statement on histamine-antagonizing agents in New and Nonofficial Drugs.) Brompheniramine exhibits a high order of antihistaminic effectiveness and a low incidence of side-effects. Thus, it has a relatively large margin of safety. The drug is also suitable for parenteral administration.

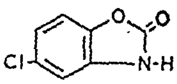
Dosage.—Brompheniramine maleate is administered orally or by subcutaneous, intramuscular, or intravenous injection. For adults, the usual oral dose is 4 mg. three to six times daily. Alternatively, a sustained release tablet containing 12 mg. may be taken every 8 to 12 hours or twice daily. For children over 6 years of age, the oral dose is one-half of that outlined for adults. Doses of 2 mg. given three times a day are usually adequate for children under 6 years of age.

For parenteral administration by the subcutaneous, intramuscular, or intravenous routes, the usual dose of brompheniramine maleate ranges from 5 to 20 mg., with an average of 10 mg. No more than 40 mg. of the drug should be given parenterally in a 24-hour period. When given intravenously, the drug should be injected slowly in a solution no more concentrated than 10 mg. per cubic centimeter. For use in reducing the danger of transfusion reactions, 10 mg. of the drug may be mixed with blood at the time of transfusion, or 10 mg. may be injected intravenously. Sterile solutions of the drug can be mixed with isotonic sodium chloride or 5% dextrose injections, but they should not be allowed to stand in contact with antigenic material used in hyposensitization procedures.

Preparations: elixir 0.4 mg. per cc.; solution (injection) 10 mg. in 1 cc., 200 mg. in 2 cc.; tablets 4 mg.; tablets (sustained release) 12 mg.

A. H. Robins Co., Inc., cooperated by furnishing scientific data to aid in the evaluation of brompheniramine maleate.

Chlorzoxazone (Paraflex).—5-Chloro-2-benzoxazolinone.—5-Chlorobenzoxazolinone.—The structural formula of chlorzoxazone may be represented as follows:



Actions and Uses.—Chlorzoxazone, introduced in 1958, is a skeletal muscle relaxant with actions and uses similar to those of zoxazolamine, of which it is a derivative. Chlorzoxazone produces higher blood levels after oral administration than does zoxazolamine. It does not have the uricosuric activity exhibited by zoxazolamine. The drug is used in the same manner as zoxazolamine for the treatment of painful muscle spasm associated with certain musculoskeletal disorders. These include low back pain, fibrositis, bursitis, myositis, spondylitis, sprains, muscle strains, and torticollis. It may also be employed in conjunction with analgesics (salicylates) and other forms of therapy for the symptomatic treatment of spasm in rheumatoid arthritis and osteoarthritis. Current evidence indicates that chlorzoxazone is of the same order of effectiveness as zoxazolamine for these musculoskeletal disorders. The drug may have some limited value as an adjunct to other therapy in the management of cervical root syndrome and disk disorders. There is little evidence that chlorzoxazone is of any appreciable benefit in spasticity of neurological origin such as in cerebral palsy, dystonia musculorum, amytrophic lateral sclerosis, and multiple sclerosis. Like zoxazolamine, the drug has not been of value in paralysis agitans (Parkinson's disease), various pyramidal tract lesions, basal ganglion disorders, or epilepsy.

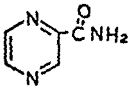
In general, the clinical toxicity of chlorzoxazone is less than that of zoxazolamine, which is the principal distinguishing feature between the two drugs. Side-effects, which are reversible and seldom require the discontinuance of medication, include occasional instances of nausea and vomiting, heartburn, abdominal distress, constipation, and diarrhea. Central nervous system effects may include dizziness, lightheadedness, drowsiness, overstimulation, headache, lethargy, or malaise. Although not frequent, hypersensitivity reactions of the skin may occur; the drug should be discontinued if pruritus or urticaria develops.

Dosage.—Chlorzoxazone is administered orally in doses which must be individualized according to the severity of the symptoms under treatment and the response of the particular patient. For adults, dosage ranges from 250 to 750 mg. three or four times a day. Dosage for children is reduced according to age and body weight.

Preparations: tablets 250 mg.

McNeil Laboratories, Inc., cooperated by furnishing scientific data to aid in the evaluation of chlorzoxazone.

Pyrazinamide (Pyrazinamide).—The structural formula of pyrazinamide may be represented as follows:



Actions and Uses.—Pyrazinamide, introduced in 1955, is a potent, synthetic, antituberculosis agent. Its tuberculostatic activity, as indicated by its ability to eradicate viable tubercle bacilli in mice, is less than that of streptomycin or isoniazid but greater than that of aminosalicylic acid. Pyrazinamide is probably more active also than either cycloserine or viomycin.

Because of its potential toxicity and relatively short period of effectiveness, pyrazinamide is considered one of the secondary drugs for the chemotherapy of tuberculosis. It is best reserved for seriously ill hospitalized patients with tuberculosis that has ceased to respond to one or more of the major chemotherapeutic agents and combinations, i. e., streptomycin, isoniazid, and aminosalicylic acid. Short-term coverage of surgical procedures to minimize or prevent the spread of infection or occurrence of other tuberculous complications is currently the chief indication for pyrazinamide. Occasionally, the drug can be used in medical emergencies for the treatment of gravely ill patients who are intolerant, by reason of acquired allergies, to other chemotherapeutic agents. Pyrazinamide is not recommended in the initial therapy of newly discovered or previously untreated cases of tuberculosis.

When pyrazinamide is used alone, organismal resistance to its tuberculostatic action develops rapidly (within six to seven weeks), rendering further use of the drug ineffectual. For this reason, there is no indication for the long-term use of pyrazinamide alone in tuberculosis.

Since past experience shows that combined anti-infective therapy is usually superior in the treatment of tuberculosis to therapy with a single drug, the question arises as to the desirability of combining pyrazinamide with other agents. Current opinion seems to be fairly well divided on this issue. When high (and potentially toxic) doses of pyrazinamide are combined with the usual doses of isoniazid, there is some evidence to suggest a synergistic action, which may provide a higher degree and a longer period of chemotherapeutic effectiveness. Such salutary effects are not observed when the dose of pyrazinamide is low. On the contrary, there is a possibility that small amounts of pyrazinamide may even interfere with the chemotherapeutic effectiveness of isoniazid. On the basis of present evidence, the use of pyrazinamide alone, given briefly before and after operation, seems to be justified solely as a means of protecting tuberculous patients against the complications of chest surgery. The ultimate value of pyrazinamide in combination with other drugs must await the results of further investigations.

Hepatic damage, with or without jaundice, has been a serious untoward reaction which has limited the usefulness of pyrazinamide. Although signs of impaired liver function often disappear upon discontinuance of medication, the damage may be progressive and irreversible and may result in death. It is estimated that jaundice occurs in about 3% of patients receiving this drug and that abnormal liver function tests are demonstrated in about 10 to 15% of patients with or without jaundice. Hence, pyrazinamide should be used only when close observation of the patient is possible (preferably in a hospital) and when adequate facilities are available for reliable liver function tests. Sulfobromophthalein retention, serum bilirubin values, thymol turbidity or cephalin flocculation tests, and serum glutamic oxalacetic transaminase determinations, as well as an examination of the urine for bile, should be carried out prior to initiating therapy in order to obtain base-line values. These tests should then be repeated at frequent intervals during therapy. The physician should realize that, while liver function tests are helpful, hepatic damage may occur with explosive suddenness. Hence, close clinical observation, with daily examination for liver enlargement or tenderness and jaundice, is imperative.

Since the drug may cause retention of uric acid in occasional patients, routine blood uric acid determinations may also be indicated; in several instances, an acute attack of gout has occurred during or after the period of pyrazinamide administration.

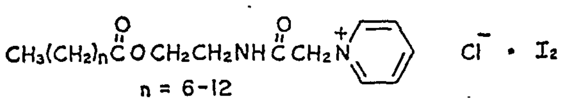
Relatively minor and infrequent side-effects to pyrazinamide include anorexia, gastrointestinal disturbances, joint pains, malaise, nervousness, dysuria, and mild febrile reactions. These effects seldom require discontinuance of therapy.

Dosage.—Pyrazinamide is administered orally. The suggested total daily dose, given in three or four divided doses, is 35 mg. per kilogram of body weight. Although some authorities advocate larger amounts (40 to 50 mg. per kilogram), it is generally agreed that the maximum daily dose, regardless of weight of the patient, should not exceed 3 Gm. When used to cover the surgical management of tuberculosis, therapy with this drug should be started one to two weeks before operation and continued through the operative period and for postoperative periods ranging from two weeks to two months.

Preparations: tablets 500 mg.

Merck Sharp & Dohme, Division of Merck & Co., Inc., cooperated by furnishing scientific data to aid in the evaluation of pyrazinamide.

Undecoylium Chloride-Iodine (Virac).—A complex of iodine with the quaternary compound, acylcolaminoformylmethylpyridium chloride, the acyl group of which is a mixture containing 8 to 14 carbon atoms but principally a 10 to 11 carbon chain. The structural formula of undecoylium chloride-iodine may be represented as follows:



Actions and Uses.—Undecoylium chloride-iodine, a complex of iodine and a cationic quaternary detergent, was introduced commercially in 1957 for topical use as a germicidal agent. Although the detergent itself has some antiseptic properties, the antimicrobial activity of the complex is derived almost wholly from the elemental iodine which is slowly released upon contact with skin and mucous membranes. The wetting action of the detergent does, however, facilitate contact of the iodine with surface areas. Since the iodine complex is water-soluble, it does not precipitate with tissue proteins as do iodine tinctures.

Undecoylium chloride-iodine is used for the prophylaxis and treatment of surface infections due to organisms susceptible to the germicidal action of iodine. However, it cannot be used in place of good surgical judgment in the management of puncture wounds or other wounds containing devitalized tissue. To date, it has been employed for preoperative and postoperative disinfection of the skin, perineum, and genital tract, for the treatment of contaminated wounds and cutaneous bacterial infections, as a douche for the control of vaginal trichomoniasis and moniliasis, and for the treatment of fungus infections of the scalp and feet. It is of the same order of effectiveness as other preparations containing iodine. In contrast to tinctures or solutions of elemental iodine, however, the complex does not cause stinging or irritation to the skin or mucous membranes. In addition, it does not stain skin or clothing. The sensitizing potential of undecoylium chloride-iodine is not known, but, on the basis of experience to date, it appears to be quite low. This possibility should be considered in patients with known sensitivity to iodine.

Dosage.—Undecoylium chloride-iodine is applied topically as needed, generally as an aqueous solution containing 0.2% available iodine. For preoperative disinfection of the skin, more concentrated solutions may be used. Because the complex is detergent, it may be used alone as a shampoo for the treatment of scalp infections.

Preparations: solutions (topical) containing 0.2, 0.6, 0.8, and 3.2% available elemental iodine.

Ruson Laboratories cooperated by furnishing scientific data to aid in the evaluation of undecoylium chloride-iodine.

COUNCIL ON FOODS AND NUTRITION

Report to the Council

The Council has authorized publication of the following report.

PHILIP L. WHITE, Sc.D., *Secretary.*

METABOLISM AND CALORIC VALUE OF ALCOHOL

Wilfred W. Westerfeld, Ph.D.
and
Martin P. Schulman, Ph.D., Syracuse, N. Y.

Not only has alcohol been a controversial subject philosophically but also the scientific literature has been full of conflicting conclusions. Our knowledge of the absorption, distribution, and excretion of alcohol is well founded and generally accepted. The pathway of alcohol metabolism has been assumed on the basis of indirect evidence without much argument, but at the present time the exact pathway by which alcohol is metabolized is still uncertain. The utilization of alcohol as a food and the complications of its excessive use are only partially understood. We do not know what the phenomena of intoxication and tolerance can be attributed to, but we do know some of the things to which they cannot be attributed.

In this review of the subject, the extensive literature cannot be cited in detail, but appropriate reviews are given in the bibliography.[1]

Metabolism of Alcohol

Alcohol is neither selectively excreted, stored, or converted to a storage form in the body nor does any major portion accumulate as fat, protein, carbohydrate, or other tissue constituent. From studies with alcohol labeled with radioactive carbon (C^{14}), more than 90% of the isotopic carbons appear as carbon dioxide by the time the alcohol has disappeared from the blood. The blood alcohol rises to a maximum during the absorption phase. After distribution and equilibration with the tissues, the blood alcohol concentration decreases lineally with time as it is metabolized. Most substances have an exponential disappearance curve, and alcohol is an unusual metabolite in this respect. A linear disappearance curve results from a saturation of the enzyme, alcohol dehydrogenase, at low concentrations of alcohol, and higher substrate concentrations per se cannot increase the rate of the reaction. At blood alcohol concentrations below 0.01% (10 mg. per 100 ml.), the disappearance curve becomes exponential because the enzyme is no longer saturated with substrate.[2]

From the Department of Biochemistry, State University of New York, College of Medicine at Syracuse.

Absorption.—As a small, neutral, water-soluble molecule requiring no digestion, ethyl alcohol can be absorbed by simple diffusion throughout the entire gastrointestinal tract, including the stomach and rectum. Orally ingested alcohol is usually passed rapidly down the gastrointestinal tract from the stomach, and approximately 80% of it is absorbed from the small intestine as rapidly as it leaves the stomach. It passes into the blood at a rate proportional to its concentration, and since there is no upper limit to its rate of absorption, alcohol does not remain or accumulate in the intestine. Absorption can be slowed by delaying the emptying time of the stomach, as by consuming food, or by ingesting dilute instead of moderately concentrated (30%) alcohol solutions; for example, beer instead of cocktails.

Alcohol also is absorbed very rapidly from the peritoneal cavity, and it can slowly be administered intravenously as a 20 to 25% solution. It can be an industrial hazard since it is absorbed through the lungs, and intoxicating blood levels can be achieved through the prolonged inhalation of low concentrations of alcohol vapors. Alcohol is not absorbed significantly through the skin.

Distribution.—The distribution of alcohol throughout the body is in proportion to the water content of the various tissues. At equilibrium, most organs contain from 70 to 80% of the plasma concentration and the body as a whole, approximately 60%. The plasma contains more alcohol per unit volume than does whole blood because the former has a higher water content. Bone contains a small amount of water and takes up little alcohol. Fat tissue has a relatively poor blood supply and low water content and has only 10 to 20% of the alcohol concentration in blood. Obese individuals, therefore, have a higher blood alcohol concentration than normal individuals when both have the same intake per kilogram of body weight. The alcohol concentration in tissues, including the brain, parallels the blood level as the latter rises and falls. At the cephalic end, alcohol enters the cerebrospinal fluid in proportion to its higher water content. It diffuses into the lumbar region rather slowly, and a comparison of the alcohol concentrations in blood and lumbar spinal fluid shows a considerable diffusion time lag in the latter.

Small amounts of alcohol (2 to 4% of the total dose) are lost into the urine and into the respiratory air by diffusion. The alcohol in these excretions is in equilibrium with the blood alcohol passing through the kidneys and lungs; hence, a determination of the alcohol concentration in respiratory air or urine can be used to estimate blood concentrations for medicolegal purposes. No significant amount of alcohol is excreted as a glycuronide or sulfate conjugate, and there is no active excretion of alcohol itself by the kidney. The total amount of alcohol lost in the urine is in proportion to the average blood concentration during urine formation and the volume of urine excreted.

Approximately 2 liters of respiratory air contain as much alcohol as does 1 ml. of blood. The total amount of alcohol lost through the lungs can be increased somewhat by hyperventilation. Large doses of dinitrophenol have been used in experimental animals to induce a hyperventilation severe enough to increase the rate of elimination of alcohol from the body; however, this has no practical value in human intoxication. Fluctuations in the small amounts of alcohol excreted are relatively unimportant, and the only way that the bulk of the alcohol can be removed is by metabolic degradation.

Because of the many variables involved, it is dangerous to try to estimate the total amount of alcohol consumed from any given blood level. However, as a quick approximation, 1 ml. (800 mg.) of alcohol per kilogram of body weight taken over a period of one hour will give a maximum blood alcohol concentration in the neighborhood of 100 mg. per 100 ml. (0.1%) in 2 hours; this is equivalent to four or five ounces of whisky for a man weighing 70 kg. (154 lb.).[3] In New York state, a blood level of 0.15% alcohol is established by law as prima-facie evidence of intoxication. Some six to eight ounces of whisky is required by an average individual to reach this level, and one ounce per hour thereafter will sustain it at that level.

Rate.—Much of the controversial literature in the alcohol field has been concerned with problems related to variations in the rate of alcohol metabolism. Most of these divergent conclusions can be reconciled by recognizing that sluggish rates of alcohol metabolism can be increased to a so-called maximum in several ways, but that none of the procedures tested will cause this "maximum" to be exceeded. Positive effects can, therefore, be obtained when the initial rate of alcohol metabolism is sluggish, but no effect will be observed when the initial rate is already at the "maximum."

The rates of alcohol metabolism differ in various species, in animals of one species, and in the same animal at different times. The rate of alcohol metabolism in different humans has been estimated to vary between 100 and 200 mg. per kilogram of body weight per hour; the value of 200 mg. per kilogram per hour is equivalent to 840 ml. or about one-fifth of a gallon of 100 proof whisky (50% alcohol) per day for a man weighing 70 kg. The maximum upper limit is close to one quart per day (240 mg. per kilogram per hour).[4] A common estimate is that the human can metabolize about one ounce of whisky per hour (720 ml. per day). The blood alcohol concentration can decrease at a rate between 10 and 25 mg. per 100 ml. per hour, but the usual rate is between 15 and 20 mg. per 100 ml., and the upper limit appears to be 20 to 25 mg. per 100 ml. per hour. A single dose of 3 Gm. per kilogram (one pint of whisky for a man weighing 70 kg.) could be fatal, whereas the same amount taken over a period of time could be metabolized without difficulty.

The rate of alcohol metabolism has been reported to be constant and independent of dosage in a variety of species, but equally competent investigators have found a higher rate of metabolism when the blood alcohol levels are high. When an effect of dosage is observed, it is relatively small (e. g., 30% increase in rate when the blood alcohol concentration is 100 mg. per 100 ml. higher).[5] Since this difference is exceeded by the individual variability encountered at the same blood level, many conflicting conclusions have resulted. It seems reasonably clear that high blood levels tend to be accompanied by higher rates of alcohol metabolism (up to the maximum of 20 to 25 mg. per 100 ml. per hour decrease in blood alcohol). However, this maximum rate is achieved in some individuals at low blood alcohol concentrations, and no effect of increased dosage can then be observed. Estimates of the maximum rate of utilization are questionable when based on rates obtained at low blood levels.

From a theoretical point of view, a higher rate of metabolism at a higher blood level is incompatible with a linear disappearance curve and would be expected to give an exponential curve. If the curve is linear and is also affected by concentration, then the higher blood alcohol level must trigger off a high rate of metabolism that is sustained at this high rate throughout its disappearance. This phenomenon cannot be due to a direct effect of the higher substrate concentration on the alcohol dehydrogenase reaction but has been attributed to a secondary (perhaps hormonal) influence of high blood alcohol levels in speeding up the concomitant carbohydrate metabolism.[1a] This results in an increased amount of pyruvate that can enter into a coupled oxidation-reduction reaction with the alcohol.[6] In this coupled reaction, the pyruvate is reduced to lactate, and the alcohol is oxidized to acetaldehyde at a faster rate than would otherwise take place.

Factors Influencing Rate.—The effect of food in decreasing the intoxicating effects of alcohol is a common observation. Proteins effectively increase the rate of alcohol metabolism. This also has been observed with two individual amino acids, glycine and alanine. Fat or carbohydrate administration is without significant effect, although a previous high carbohydrate diet predisposes a high rate, and a previous high-fat diet predisposes a low rate of alcohol metabolism. In fasting, the rate remains high during the first few days while the carbohydrate reserves are consumed. The rate falls appreciably while the fat reserves are being utilized but increases again as the proteins are used. Feeding a low-protein diet reduces the rate by depleting the liver enzymes responsible for alcohol metabolism.[7]

The rate of alcohol metabolism is quite insensitive to the over-all metabolic needs of the organisms. Hyperthyroidism has no effect on alcohol metabolism. Exposure to external cold or muscular exercise sufficient to double the metabolic rate also has no effect on the rate of alcohol metabolism. Reducing the body temperature slows all metabolic reactions, and in cold-blooded animals the rate of alcohol metabolism follows the usual relationship for chemical reactions by being doubled for each rise in temperature of 10 degrees.

Three related substances, insulin, pyruvate, and fructose, have been reported by a variety of investigators to increase the rate of alcohol metabolism in animals and humans. This has been a highly controversial area, since about an equal number of investigators have obtained negative results. Most of the discrepancies can be reconciled with the following interpretation. 1. Glucose or insulin alone may increase the rate of alcohol metabolism in the dog or human, but the two together are more certain to increase the rate. 2. None of these agents appears to have any effect when the existing rate of alcohol metabolism is already high (a decrease in blood alcohol of 20 to 25 mg. per 100 ml. per hour), but all three will stimulate an initially sluggish rate (10 mg. per 100 ml. per hour) and increase it to the rate of 20 to 25 mg. per 100 ml. per hour. This relationship was described for the insulin effect by Widmark[8] over 20 years ago, and a similar relationship has been observed for the pyruvate effect.[1a] The rate of 20 to 25 mg. per 100 ml. per hour decrease in blood alcohol appears to be the maximum that can be achieved in these species, even with a brisk concomitant carbohydrate metabolism; lower rates of alcohol metabolism can be increased by stimulating carbohydrate breakdown.

The effect of insulin, insulin plus glucose, or fructose alone, can be attributed to an increase in carbohydrate metabolites such as pyruvate. Insulin is not required for fructose metabolism, and the administration of fructose alone increases blood pyruvate more than glucose does; this increase is suppressed when alcohol is also being metabolized. Glucose will increase blood pyruvate in the normal person but not in the diabetic unless insulin is also administered. Insulin undoubtedly increases the breakdown of glucose to pyruvate, and the effect of all of these agents on alcohol metabolism appears to have pyruvate or other carbohydrate intermediates as the common denominator. The increased rate of alcohol metabolism, resulting from the coupled oxidation-reduction reaction between pyruvate and alcohol, is accompanied by a mild metabolic acidosis in the human from the accumulated lactic acid.[9]

Alcohol and Carbohydrate Metabolism

The effect of alcohol on the blood sugar level appears to be the resultant of two opposing effects: (1) a stimulation of carbohydrate metabolism, which tends to decrease the blood sugar, and (2) a glycogenolysis, which tends to increase blood sugar at the expense of liver glycogen. In the normal person, the resultant is only a minor fluctuation in blood sugar; however, in the diabetic or others with depleted liver glycogen, alcohol administration decreases the blood sugar. Alcohol suppresses epinephrine or alimentary hyperglycemia and decreases the amount of liver glycogen formed from glucose. Alcohol itself is not converted to liver glycogen. Conversely, a high level of blood sugar does not have much effect on the rate of alcohol metabolism but will protect animals from the lethal effects of alcohol. A lethal blood alcohol concentration of 0.8% at a blood sugar level of 70 mg. per 100 ml. becomes 1.2% at a level of 200 mg. per 100 ml. of blood sugar.[10]

Diabetes.—In view of the previously noted relationship between alcohol and carbohydrate metabolism, the rate of alcohol metabolism in the untreated diabetic would be expected to be slowed. This has been demonstrated adequately in depancreatized animals. It is probably also true in human diabetics, but the variability encountered in the severity of the disease, the differences in insulin treatment, or insulin withdrawal before testing have led to inconsistent results.

The effect of alcohol in the diet of the diabetic has not been studied adequately. It seems clear that alcohol neither has a major antiketogenic effect in fasting or in diabetes nor is any major portion of the alcohol excreted as extra ketone bodies. The long-range effects of alcohol ingestion by the diabetic, particularly the stimulation of the adrenal cortex and the tendency toward fatty livers, are unknown.

Habituation and Tolerance

A tolerance to alcohol develops after its continued use, but it is lost after a number of months of abstinence. During the tolerance phase, larger doses of alcohol are required to produce the same pharmacological effect. Habituation to alcohol has no effect on the entry of alcohol into the central nervous system, the concentration of liver alcohol dehydrogenase, or the excretion of alcohol. The absorption of alcohol from the gastrointestinal tract is either unchanged or slightly more rapid after habituation, but it is clearly not delayed. Occasional data have been reported which indicate a higher rate of alcohol metabolism after habituation, but this is not found to be consistent in either animals or humans. It is generally agreed that habituation has no significant effect on the rate of alcohol metabolism. In the human alcoholic, tolerance to alcohol is first increased, but after long-continued use it returns to normal or subnormal levels. No correlation has yet been made between this change in tolerance and the extent of liver damage or between the rate of alcohol metabolism in the chronic alcoholic and the extent of liver damage.

It is quite clear that the phenomenon of tolerance cannot be attributed to a faster removal of alcohol from the system. At the same level of blood alcohol, the intoxicating effects are greater when the blood level is rising than when it is falling, and the electroencephalographic changes are also greater at any given blood level when it is rising.[11] Habituated animals and humans sober up faster, even though the level of blood alcohol falls at a normal rate. The phenomenon of tolerance is an adaptation of the central nervous system to alcohol rather than an alteration in the metabolism of alcohol. It is, therefore, theoretically possible to alleviate the intoxication symptoms without altering the metabolism of the alcohol. Such beneficial results have been reported from the use of insulin or the breathing of pure oxygen or a mixture of 90% oxygen and 10% carbon dioxide. The electroencephalographic changes that result from the consumption of alcohol are similar to those observed in anoxia, which enhances the intoxicating effects of alcohol. The caffeine in a cup of coffee may or may not alleviate the intoxication symptoms, but it has no effect on alcohol metabolism.[12]

Most unicellular organisms can tolerate an alcohol concentration of 2%, whereas yeasts can ferment sugar to an alcohol concentration of approximately 14%. The lethal blood level for many animals is in the range of 0.8 to 1.0%, but acute alcoholic deaths in humans sometimes occur at blood levels of 0.4 to 0.6%. Although the human is probably more sensitive to alcohol, these comparative figures cannot be accepted at face value because most acute alcoholic deaths in humans occur in physically debilitated individuals and often from causes other than the alcohol per se. Acute alcoholic death results from respiratory failure; however, if artificial respiration is used to maintain the animal, the blood alcohol level can be increased to 1.2 to 1.3% before cardiac failure ensues. Presumably artificial respiration would have a similar protective effect in the severely intoxicated human. The addition of glutamine to the growth medium of the bacterium Streptococcus faecalis inhibits the toxic effects of alcohol. How glutamine exerts this effect and whether a similar response could be obtained in mammals are still unknown.

Site and Pathway of Metabolism

Both the liver and kidney are rich sources of alcohol dehydrogenase, and both organs are capable of oxidizing alcohol to carbon dioxide at a brisk rate. In the intact animal, the liver is the major organ involved in both alcohol and acetaldehyde metabolism, whereas the kidney plays a minor role.[13] Hepatectomy or liver damage decreases the rate of alcohol metabolism significantly, but kidney damage has no effect. The rate of disappearance of alcohol from the blood can be correlated with the amount of active liver tissue present in the animal.

An eviscerated preparation metabolizes alcohol at less than 10% of the normal rate. Hence, the heart, lung, brain, muscles, and skin contribute very little to the metabolism of alcohol in the intact animal. On the basis of perfusion studies and the conversion of isotopic alcohol to carbon dioxide, the heart and lung can utilize alcohol slightly. Pigeon breast muscle utilizes alcohol, but mammalian skeletal muscle cannot metabolize alcohol. The brain has no significant alcohol-oxidizing ability. Isotopic alcohol is not converted to carbon dioxide by brain tissue in vitro, and there is no indication from in vivo studies that isotopic alcohol is metabolized by brain tissue.[14] Ordinary intoxicating levels of blood alcohol do not have any effect on the oxygen consumption or glucose utilization by the brain.

A variety of studies have indicated that alcohol is oxidized to acetaldehyde as the first step in its metabolism. Only those tissues containing alcohol dehydrogenase metabolize alcohol at a significant rate. Although catalase can oxidize alcohol in vitro under certain conditions, it is not responsible for alcohol oxidation in vivo. Blood acetaldehyde increases after alcohol administration in most species, including the human, but not appreciably in the dog. The increase in blood acetaldehyde is exaggerated by pretreatment with disulfiram (Antabuse). Alcohol dehydrogenase is a zinc enzyme that requires diphosphopyridine nucleotide as a cofactor and the cytochrome chain for complete reaction with oxygen. On the basis of the alcohol-acetaldehyde equilibrium constant, only a very small portion of the alcohol can be oxidized to acetaldehyde in vitro before the reaction stops. The reaction continues in vivo because the acetaldehyde is removed by further metabolism. The oxidation of alcohol to acetaldehyde is the slowest reaction in the chain of metabolic reactions and is, therefore, the one which must be accelerated in order to increase the rate of alcohol metabolism.

The fate of the acetaldehyde is still uncertain. Liver contains several enzymes that are capable of oxidizing acetaldehyde to acetic acid, but some of them are not involved in acetaldehyde metabolism.[15] Acetic acid cannot be detected in the intact animal's metabolism of alcohol. In vivo studies with isotopic alcohol have indicated that free acetic acid is probably not an intermediate. Acetyl coenzyme A (CoA) is probably formed from alcohol, since labeled alcohol gives rise to a labeled acetyl group in acetylated sulfanilamide. The major acetylating agent is presumably acetyl CoA. Acetaldehyde appears to be converted to acetyl CoA without first being oxidized to free acetic acid. The acetyl group of acetyl CoA could then be expected to be completely oxidized to carbon dioxide and water in the citric acid cycle. High concentrations of citrate have been found in rat kidney after alcohol administration.

Nutritional Value of Alcohol

Alcohol is a high-calorie food and yields about 7 calories per gram, as compared with 9 calories per gram for fat and 4 calories per gram for carbohydrate or protein. One ounce (30 ml.) of 100 proof whisky contains 15 ml. or 12 Gm. of alcohol, which contributes 84 calories. Three ounces of whisky is equivalent to one ounce of fat or oil from a caloric standpoint, and, because of its water solubility, alcohol has some possible utility in parenteral nutrition. It can furnish a large proportion of the daily caloric needs. Chronic alcoholics consuming a fifth of whisky per day obtain 2,240 calories from the alcohol; this represents over 75% of the average daily total intake of 2,500 to 3,000 calories. All of the distilled beverages supply calories but represent a diet grossly deficient in vitamins, minerals, and proteins. Beer and wine contain some protein, as well as a few minerals and vitamins, but their main nutritional contribution is calories. Twelve ounces of 4% beer or 4 ounces of wine containing 12% alcohol supply 81 calories.[16]

When the calories derived from alcohol are a small percentage of the total, the alcohol appears to contribute to the economy of the organism in about the same way as fat or carbohydrate; it spares protein degradation for energy and supports growth. However, when the calories derived from alcohol represent a major portion of the total intake, the alcohol is not as good a source of calories as either carbohydrate or fat; it then fails to support growth or weight restoration as well as an isocaloric quantity of fat or carbohydrate. It is possible that the calories in alcohol are not utilized in the body as well as the calories in carbohydrate or fat at all dosages but that the differences at low dosages are too small to detect. It is also possible that large doses of alcohol are wasteful because they dissipate body heat through a dilatation of the skin vessels. At the present time it is not clear whether alcohol can be utilized for muscle work. The alcohol itself cannot be oxidized by muscle, but intermediate metabolites might be utilized.

Alcohol neither changes the basal metabolic rate nor exerts any specific dynamic action. The theoretical respiratory quotient (CO_2/O_2) for the combustion of alcohol is 0.667. When an animal has a high respiratory quotient from the burning of carbohydrate, the administration of alcohol lowers it. This decrease in the respiratory quotient is accompanied by a slight increase in total oxygen consumption in order to maintain the same caloric turnover (120 calories per mole of oxygen for the combustion of glucose and 107 calories per mole of oxygen for alcohol.)[17]

Nutritional Complications

The high-alcohol diet consumed by many chronic alcoholics is nutritionally inadequate in many respects. Three deficiency syndromes are particularly common in alcoholics: (1) polyneuropathy resulting from thiamine deficiency, (2) pellagra resulting from niacin deficiency, and (3) fatty liver (and eventually cirrhosis) resulting from a low-protein, low-lipotropic intake. Wernicke's syndrome and Korsakoff's psychosis are often associated together in alcoholics and are thought to result from chronic nutritional deficiencies. Treatment with thiamine corrects some of the symptoms of the former but not the latter. Alcoholic polyneuropathy and pellagra were once thought to be due to a direct toxic effect of the alcohol but are now recognized as vitamin deficiencies resulting simply from an inadequate intake. These deficiencies can be corrected by the administration of appropriate vitamins, in spite of a continued high intake of alcohol. The amount of thiamine required in a diet is increased by a high-carbohydrate intake and decreased by a high-fat intake. Alcohol acts like fat in sparing thiamine; therefore, the thiamine deficiency in alcoholics cannot be attributed to an increased requirement.[18]

It should be emphasized that animals, including the human, eat in relation to their appetite, and the appetite is normally geared to their caloric needs. When his appetite has been satisfied, the animal stops eating, even though the intake of vitamins, minerals, and proteins is still inadequate. The dietary essentials must be present in the amount of food required to fulfill the caloric needs, or such essentials will not be obtained. Alcohol is not simply added to the diet that would otherwise be consumed in its absence, but instead it is substituted for some of the food. The more calories consumed as alcohol, the less food will be eaten. This substitution, resulting in decreased food consumption, is sometimes ignored experimentally when the alcohol is added to the drinking water or given separately from the food. An adequate diet can become inadequate in essential nutrients by adding alcohol to the total diet rather than substituting it for some of the carbohydrate or fat.

Fatty liver and cirrhosis are the characteristic features of chronic consumption of alcohol by animals or humans. With or without alcohol these changes are characteristic of a low-protein, choline-deficient diet and can be prevented or, in the case of fatty liver, be reversed by administration of choline or methionine or by a high-protein diet. It has not been established that small doses of alcohol have a greater effect in producing fatty livers than an isocaloric quantity of pure carbohydrate, but in many experiments the presence of alcohol appears to produce an earlier and more intense fatty change in the liver. It precipitates a more severe choline deficiency, as manifested by hemorrhagic degeneration in the kidney of the young rat.[19]

Large doses of alcohol exert a more specific effect in producing fatty livers than simply supplying calories, and this effect is mediated, at least in part, through the pituitary and the adrenal cortex. The rapid accumulation of liver lipids (11 to 15 hours) after alcohol has been consumed does not take place in an adrenalectomized or hypophysectomized animal, but the effect is restored by cortisone.[20] The fat deposition in the liver is prevented by fasting. No major portion of the alcohol itself accumulates as fat.

There is considerable evidence that relatively large doses of alcohol stimulate the adrenal cortex. Alcohol decreases adrenal cholesterol and ascorbic acid and causes involution of the thymus. As determined by the thymus maintenance dose, the adrenal cortical activity is increased markedly by alcohol. The adrenal hypertrophies with a continuing intake of alcohol, and the plasma 17-hydroxycorticosteroids are increased by a disulfiram-alcohol reaction.

Alcohol causes a release of vitamin A from the liver in various species, with a resulting increase in plasma concentration and a depletion of liver stores. Apparently no deficiency of vitamin A results from this effect, but rats on a deficient diet gain less weight when alcohol is added to minimal doses of vitamin A.

Summary

Alcohol is a high-calorie food and drug; it requires no digestion and imposes no absorption problems. It is distributed throughout the body water, and there are no effective ways of removing it except by metabolic degradation in the liver. The latter process is relatively slow and constant and leads to a complete burning of essentially all the alcohol ingested. Its rate of removal is dependent to some extent on the concomitant carbohydrate metabolism, but it is relatively independent of other factors. Tolerance to alcohol is an adaptation of the central nervous system rather than an altered rate of metabolism of the alcohol. As a food, it is a highly purified diet that supplies only calories; it thereby precipitates several vitamin deficiencies, as well as a fatty liver, and eventually cirrhosis. In large amounts alcohol is not as good a food source of calories as pure carbohydrates or fat.

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NERVOUS CONTROL OF HOLLOW VISCERA.—The concept that the sympathetic and parasympathetic components of the autonomic nervous system act antagonistically to control the activity of the automatic tissues has established applicability in a very few situations—one being the control of the heart rate, for example. The idea that this balance between sympathetic and parasympathetic influences is of wide importance is derived in part from the anatomic fact of the dual innervation of some organs and in part by reasoning from the effects of injecting substances known to be chemical mediators.

There are, however, objections to any formulation which depends upon dual, antagonistic extrinsic nervous influences to explain the regulation of most of the intrinsically rhythmic tissues. . . . The results of nerve-section experiments are inconsistent with the concept that the control of bladder and intestinal activity is through antagonistic effects of the sympathetic and parasympathetic nervous systems. The urinary bladder is not paralyzed but is rendered hyperactive by parasympathetic ("motor") denervation. Intestinal activity is augmented by sympathetic denervation, but this effect cannot be due to unopposed vagal influences, since vagal section does not alter the hyperactivity.

A more consistent explanation is derived by considering that sensory denervation removes the sympathetic inhibitory tone initiated by distention of the organ, that is, that activity is limited by the same stimulus that initiates it.—F. H. Meyers, M.D., A Critique of the Concept of Sympathetic-Parasympathetic Antagonism, *Journal of The American Geriatrics Society,* February, 1959.

THE JOURNAL
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A CENTURY OF DENTAL PROGRESS

THE approaching 100th anniversary of the founding of the American Dental Association signifies a century of achievement and progress in the fields of dental education, dental science, and professional responsibility. The 90,000 members of the American Dental Association are professional descendants of the small group of 26 dentists who convened at Niagara Falls on August 3, 1859, to establish the first permanent dental organization in the United States. In the hundred years that have followed, American dentistry has achieved a maturity that has given it world leadership.

It was in the United States that dentistry was first recognized as a separate, independent profession with its own formal program of dental education. However, at the turn of the century many dental schools were still unadorned commercial enterprises, which gradual reforms, instituted by organized dentistry, forced out of existence. The accrediting agency of the dental profession has been the American Dental Association's Council on Dental Education. Through a well-conceived program of inspection and accreditation this body has exercised a pronounced impact on dentistry and dental education throughout the world. There are now 42 dental schools in the United States, all associated with universities. Postgraduate training has been encouraged by the Council on Dental Education. Last year some 22,000 graduate dentists enrolled in continuation courses, special clinics, and hospital teaching programs. Dental services can now be obtained in about one-third of the nation's hospitals.

A significant influence on the progress of dentistry in the 20th century has been dental research. With enhanced knowledge from scientific research have come advances in restorative dentistry, the discovery of new filling materials, new methods for the treatment of dental cavities, the introduction of procaine for the elimination of pain, new techniques and materials for the treatment of patients requiring dentures, and emphasis on the conservation of the diseased tooth. Finally came the realization that the only genuine solution to the problem of dental disease lay in prevention. Among more recent attitudes is the attention directed to the relation between the rate of dental decay and the concentrated sugars consumed, the measurement of decay activity as determined by bacterial counts in the saliva, and the effect of a trace of fluorine in drinking water on the rate of dental decay.

Dental scientists are now using radioactive tracers, the electron microscope, and polarized light and transillumination in an effort to unlock the mystery of dental decay. Comprehensive investigations on dental problems are being conducted in schools and research centers throughout the United States.

In addition, the American Dental Association has been a factor in advancing dental health on a world-wide scale by its active support of the Fédération Dentaire Internationale and through it the World Health Organization.

Thus it is apparent that the American Dental Association has a long distinguished record of public service and it can face the future with reasonable expectancy of significant improvements in the nation's dental health. THE JOURNAL of the American Medical Association extends centennial birthday greetings and best wishes for a second century of dedication to the welfare of the American people.

NATIONAL HOSPITAL WEEK

The observance of National Hospital Week, May 10-16, provides an opportunity for the medical profession to aid the nation's hospitals in developing better understanding of their services to the American people. Emphasizing the theme "More Roads to Recovery," the program this year will endeavor to explain how improvements in hospital care are making recent advances in medical science meaningful to every patient. This is an especially appropriate time for tours of hospital facilities, talks to community groups, radio and television programs, and newspaper announcements. National Hospital Week offers a splendid opportunity for cooperation between physicians and hospitals in creating greater appreciation of the entire medical team.

ORGANIZATION SECTION

SCHOOL HEALTH SESSION TO PRECEDE ATLANTIC CITY MEETING

School health will be the subject of a meeting to be held at the Claridge Hotel, Atlantic City, at 7:30 p. m. on June 7. Interested physicians will find it convenient to combine attendance at the school health session with the A. M. A. meeting which officially opens the next day. The program, to feature "The Changing Role of the School Physician," "The Future of School Nursing," and "Trends in School Health Education," is open to school personnel as well as to the medical profession. The American School Health Association is sponsoring the meeting in cooperation with the A. M. A. Department of Health Education.

NEW LEAFLET ON A. M. A. SERVICES

It's your A. M. A., and it's here to serve you!

This is the message of a new leaflet entitled "Science and Service to Humanity" being distributed by the American Medical Association to physicians with their 1959 membership cards.

The leaflet explains the meaning and value of A. M. A. membership and points out that by virtue of his membership each physician becomes an investor in humanity.

Although the leaflet does not attempt to cover all services, it stresses that each member has at his finger tips the vast scientific, socioeconomic, public service, and informational resources of the Association. The leaflet stresses that many A. M. A. members fail to take advantage of membership benefits. It urges doctors to use their membership privileges for their own benefit and for that of their patients.

SPECIAL SESSION ON AGING

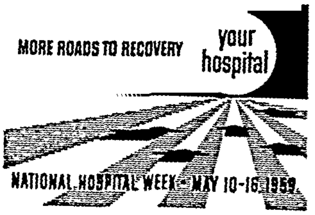
The Committee on Aging of the Council on Medical Service will present a special session on New Concepts in Aging during the annual convention of the American Medical Association in Atlantic City, June 8-12. This one-day session, to which all physicians are invited, will be held in Room C of the Convention Hall at 9 a. m. Wednesday, June 10. The meeting is being designed to present the practicing physician with a concentrated review of current thinking regarding health care of the aged and to provide him with concrete health recommendations which he can translate to his own older patients.

Keynoting the session will be a series of panels devoted to diseases among the aged, nutritional counseling, promoting physical fitness, and motivating the older person. Panel members will include such authorities as Drs. Leland S. McKittrick, Brookline, Mass.; Edward C. Reifenstein, New York; Irving S. Wright, New York; Walter E. Vest Jr., Denver; Frederick J. Stare, Boston; Norman Lee Barr, Bethesda, Md.; Ewald W. Busse, Durham, N. C.; and Howard P. Rome, Rochester, Minn.

These and 10 other experts in their fields will cover such points as (1) special treatment aspects of cardiovascular, neoplastic, and bone diseases among older persons, (2) effects of adequate nutrition on rehabilitation potential for older patients, (3) variables in prescribing a physical activity program for the older person, and (4) the effects of physical health, social adjustment, and psychological functioning on motivation in the older person.

Each panel presentation will be followed by a discussion period in which the primary interests of the audience will be explored and important ideas summarized. Dr. Edward L. Bortz of Philadelphia will close the session by summarizing the health recommendations brought out during the day in a "formula for full living" by the aging person.

Physicians planning to attend the session are invited to send questions or points they would like to see discussed to the Committee on Aging, A. M. A., 535 N. Dearborn St., Chicago 10. The areas of interest so indicated will be brought out as far as possible during the session. Queries should be received at A. M. A. headquarters not later than Wednesday, May 27.



COUNCIL ON MEDICAL EDUCATION AND HOSPITALS

The following study by the Council has been carried out during the past 30 months, as conceived and followed through by Glen R. Shepherd, M.D., Assistant Secretary of the Council. It was made possible only through the active cooperation and time of many institutions and organizations in supplying the information requested, and deep appreciation is expressed to them. It is presented in the expectation that the new information provided by the study will be of assistance in the future planning by the various groups involved to meet better the needs of physicians in continuing their education.

WALTER S. WIGGINS, M.D., *Secretary.*

A GEOGRAPHICALLY ORIENTED STUDY OF POSTGRADUATE COURSES AND ENROLLMENTS IN THE UNITED STATES FOR PHYSICIANS DURING THE YEAR 1956-1957

This article provides new information about the marked mobility of physicians enrolling in postgraduate courses, outlines a "threshold factor" in education, presents the distribution of subjects of courses, and points out the important role that medical centers have in attracting physician enrollments. The data and conclusions are based on a large representative sampling of 695 courses in which there were 20,432 enrollments. The study by the Council on Medical Education and Hospitals should be of interest and use to all those concerned with the planning of postgraduate courses for physicians, emphasizing as its data does the importance of regional and national conceptions in this field rather than confining the planning within each state, as has often occurred in the past, without regard to the educational opportunities elsewhere in the region and nation.

Introduction

For many years, the Council on Medical Education and Hospitals, in connection with its listing of postgraduate courses, has collected information on numbers of enrollments in the courses. With evidence of advancing interest in the continuation education of physicians as well as the apparent need for a more informed and concerted effort in this field, the Council intensified its studies in regard to the postgraduate courses that were to be offered in the year Sept. 1, 1956, to Aug. 31, 1957. Three new kinds of information secured that year from the sponsoring institutions and agencies pertained to (1) the characteristics of the courses, (2) courses that were cancelled rather than being actually offered, and (3) the geographical source of the physicians enrolling in the courses. An analysis of the characteristics of the courses was prepared and published in the annual report of the Council,[1] in 1957. The other information collected has been the subject of analysis and study during the intervening period, and it is the subject of this report.

It was initially expected, in planning this project, that physicians confined any travel they did for purposes of continuing their education to centers nearby, and that a geographically oriented study would reveal the regions involved. This would make it possible for all institutions and organizations in each region that wished to engage in some cooperative planning to do so with the knowledge that they were drawing their enrollments from the same places; i. e., that they were likely to be planning for the same physicians. However, study of the extensive data has revealed much other information than was originally anticipated. It is presented here with the expectation that it will be useful in future planning in this important phase of medical education.

Another project that is currently in progress is concerned with qualitative factors of postgraduate courses, with the expectation that if a suitable and reliable means of securing such information is developed, it will be possible to inform the profession only about those courses which merit their time and energy.

Perhaps the most basic premise on which the Council's activities in the field of postgraduate medical education are based is that high quality courses stimulate the participation of more physicians in further continuation education. It follows that the provision of a suitable number of effective courses is a sine qua non to other approaches designed to insure that physicians remain abreast of advances in medicine.

Presentation of Data

Methods of Study

The current study, as well as that presented two years ago, is based on information collected for and in relation to the postgraduate courses listed in The Journal.[2] The description of the educational activities listed in 1956-1957 was as follows: "Postgraduate medical education courses consist of planned activities for doctors of medicine intended to refresh physicians in various aspects of their basic medical education, to provide information on new developments in medicine, to acquire new skills, and to stimulate further educational efforts by the participants. Postgraduate courses for practicing physicians, for purposes of the listing, do not include clinical-pathological conferences, staff meetings, the conferences of an approved residency program, or the usual medical society meetings which are listed elsewhere in The Journal. Neither do they include courses accredited for specialty board certification or for credit toward advanced degrees."[3] The activities mentioned in the last sentence involve graduate medical education predominantly, not postgraduate, in the present frame of reference and terminology used by the Council.

The list of 1,280 courses was published in July, 1956.[2] Beginning with September, 1956, and continuing monthly, requests for enrollment information were sent to the sponsoring institutions and organizations about courses scheduled in that month. Follow-up requests were sent when information was not received. The median number of follow-up requests attempting to elicit the information was four, with a range from one to nine. The information requested in addition to the total number of course enrollments by M.D.'s in general or part-time specialty practice, in full-time specialty practice, and in residency training was the geographical source of each enrollment of an M.D. in practice, i. e., the city and state in which his practice office was located. Every attempt was made to secure as complete information as possible.

The thousands of items of information collected had to be dealt with by IBM punch-card methods. This was done by utilizing the grid numbers across the top of each map in a standard atlas as well as the letters down the side. The coordinates for each city in each state from which enrollments were reported were punched in the cards together with the number of enrollments and the city of the course involved. Since there were individual code numbers for each course, it was possible also to correlate the enrollment data in the geographical study with other characteristics of the courses.

Considering that this aspect of the study involved the geographical location of the courses as well as of the enrollments, the site of the courses was by city rather than by institution. This meant that for the 152 institutions and organizations sponsoring reported courses, only 73 cities were involved. This also required the designation of the "postgraduate center" (each of the 73 cities) as including certain satellite cities and suburbs in order to avoid an unwieldly and relatively unmeaningful large number of corporately separate though geographically related cities and towns. Thus, Seattle and Tacoma were considered as one center, as was San Francisco, Oakland, and nearby communities. The grouping will be presented in regard to the data obtained.

Because of the itinerant nature of circuit courses, they were excluded from the study. Home-study courses also were excluded. A total of 226 courses were cancelled for lack of sufficient physician enrollment.

After the machines had sorted and grouped the punched information in the several ways required, tabulations were printed by the machine. It was those tabulations that provided the data from which were obtained the tables as well as the maps.

In order to secure information about geographical relationships that would not be apparent otherwise, maps were drawn from the tabulated data, each map showing for a specific "center" the origin of its enrollments. In all, maps were prepared depicting the origin of the enrollments for 50 of the 73 postgraduate course centers. The remainder were not mapped for one of the following three reasons: 1. The number of enrollments was less than 20 and thus insufficient to provide significant information. 2. All of the enrollments came from the immediate vicinity of the city. 3. So many of the enrollments came from a widely scattered area throughout the United States that no regionalization was evident.

After the preparation of all the maps to the same scale of miles (2⅛ in. per 100 mi., with the master map for the United States thus being about 64 in. across), it was possible to prepare radii graduated in miles on transparent plastic to determine travel distances for the centers mapped. It was also possible to study the individual maps and compare them by superimposition to determine areas of overlap. In this way, significant relation or lack thereof between adjacent postgraduate course centers could be identified and the extent of the educational service area overlap determined.

The foregoing were the basic materials of the study from which were prepared rank order tables, correlations, and relationships, and from which the conclusions were drawn.

Comment

It should be made perfectly clear that the data collected, insofar as numbers of enrollments is concerned, does not reveal and should not be interpreted as showing the number of individual physicians enrolled in postgraduate courses. Enrollments cannot be equated with individuals because one physician may and often does enroll in more than one course. Thus, 10 enrollments may mean that one physician enrolled in 10 courses, or that two physicians each enrolled in 5 courses, or indeed any combination whose product equals the number of enrollments. The only valid relationship between numbers of individual physicians and numbers of enrollments is that there cannot be a higher number of individuals than is the total enrollment for the country. There can be and probably often are fewer individual physicians than is the number of enrollments or their sum.

Table 1.—*Comparison of Characteristics of Courses in Geographical Study and of All Courses Reported in 1956-1957*

	% in Present Study	% of Total Reported
Kind of course		
Continuous refresher	57	58
Intermittent refresher	41	30
Other	2	12
Methods of education		
Active	81	87
Passive	19	13
Designed for		
General practitioners and partial specialists	62	68
Full-time specialists	27	20
Both of above	11	11
Location of course		
Medical school	65	59
Nonschool hospital	21	24
Hotel	2	4
Other	12	13
Sponsorship of course		
Medical school	42	35
Postgraduate school	21	26
Hospital	11	12
Medical society	11	14
Government and other	15	13

Only if there were a national registry of the postgraduate course activities of all physicians in the United States would it be possible to secure information on the actual number of physicians enrolled in postgraduate courses in any given year. The data in this study about the mobility of physicians and their travel to places distant from their home state makes this conclusion inescapable.

This study is not presented as being totally inclusive, although it comprises a sufficiently large and representative sampling to enable significant conclusions to be drawn. The number of courses, as well as the number of enrollments, should always be understood in this report to refer only to the 695 courses regarding which geographical data on enrollments was reported to the Council (73% of the total of 951 courses reported for 1956-1957 excluding circuit and home study courses) and only to the 20,432 enrollments for which geographical source was reported (78% of the total enrollments of 26,231 reported in 1956-1957 exclusive of the 8,682 in circuit and home study courses). Therefore, when a state is cited as having no courses or as having a certain rank order, this may not be absolutely true, but it is the fact within the framework of this study, which can utilize only data that was supplied. Repeated requests were made to all sponsors of the courses listed for enrollment and geographical information. In 11 instances, seven such requests were made of each; in 2 instances, eight requests were made. In fact, there was a median of four requests made for information from sponsors who did not supply the information.

It is known that such lack of information distorted the picture in at least three centers, i. e., Minneapolis, Chicago, and San Francisco. In most other instances the data lacking was less important because of the presence of other institutions and organizations in the center cities which did supply sufficient adequate information or because the institutions or organizations which did not cooperate had relatively few enrollments or courses. It is

Table 2.—*List of Seventy-three Postgraduate Course Centers in Study, with Code Numbers of Composite Center*

Code No.	Course Center	Code No.	Course Center
01	Montgomery, Ala.*	35	Omaha
02	Los Angeles (including La Guna Beach and Duarte)	36	Jersey City and Newark, N. J.
03	Carmel and Monterey, Calif.	37	New York
04	San Francisco, (including Oakland, Santa Rosa, Martinez & Castro Valley)	38	Roslyn and Glen Cove, N. Y.
		39	Albany, N. Y.
		40	Buffalo
05	Fresno, Calif.	41	Glens Falls, N. Y.†
06	San Diego, Calif.*†	42	Rochester, N. Y.
07	Santa Barbara, Calif.	43	Syracuse, N. Y.
08	Colorado Springs, Colo.*	44	Asheville, N. C.
09	Denver, Colo.	45	Chapel Hill and Durham, N. C.
10	New Haven and Middleton, Conn.		
11	New London, Conn.*	46	Charlotte, N. C.
12	Wilmington, Del.†	47	Morganton, N. C.
13	Miami (including Miami Beach & Coral Gables), Fla.	48	Cincinnati
		49	Cleveland
		50	Columbus, Ohio
14	Jacksonville, Fla.	51	Oklahoma City
15	Atlanta, Ga.*	52	Portland, Ore.
16	Warm Springs, Ga.*	53	Philadelphia
17	Chicago (including Evanston, Chicago Heights & Joliet)	54	Pittsburgh
		55	Charleston, S. C.
18	Indianapolis	56	Nashville, Tenn.
19	Des Moines, Iowa	57	Oak Ridge, Tenn.
20	Iowa City	58	Austin, Texas†
21	Kansas City, Kan.	59	Corpus Christi, Texas†
22	Louisville, Ky.	60	El Paso and Fort Bliss, Texas
23	New Orleans		
24	Shreveport, La.	61	Houston, Texas
25	Waterville, Maine*	62	Lubbock, Texas†
26	Baltimore	63	San Angelo, Texas†
27	Boston (including New Bedford & Waltham)	64	San Antonio, Texas
		65	Temple, Texas
28	Brewster, Mass.*	66	Texarkana, Texas
29	Southbridge, Mass.‡	67	Salt Lake City
30	Ann Arbor, Mich.	68	Burlington, Vt.
31	Minneapolis and St. Paul§	69	Charlottesville, Va.
32	Jackson, Miss.	70	Seattle and Tacoma, Wash.
33	St. Louis (including Belleville, Ill.)	71	Madison, Wis.
		72	Washington, D. C.
34	Lincoln, Neb.	73	Providence, R. I.

† Only local physicians attended.

‡ Course actually held in New York City.

§ Because of lack of reporting by University of Minnesota, it appeared that only local enrollments occurred.

* Fewer than 20 enrolled.

also possible that of those reporting enrollments and geographical source, the data was incomplete. This is known to be true in one midwestern city, but if the complete information had been reported in that instance, it would have made an insignificant change in the rank order of enrollments, although it might have increased an already large average travel distance.

the courses in this geographical study are similarly distributed in terms of kind of course, sponsorship, location, educational methods, and who designed for, as compared with all courses reported in 1956-1957.[1] Table 1 presents this comparison. It reveals a remarkable similarity without significant differences, demonstrating that the 695 courses in the present study are a truly representative sampling

TABLE 3.—*Enrollment, Courses, and Physician Populations by State Centers*

State of Origin of Enrollment	Physician Population	Courses, No	Centers, No.		Subjects, No.	Physician Enrollment, No.	Enrollment: Population, %	Enrollment, No.		Enrollment, %	
			Absolute	Area				In-State Courses	Out-of-State Courses	In-State Courses	Out-of-State Courses
Alabama	2,341	1	1	1	1	70	2.9	0	70	0.0	100.0
Arizona	1,075	0	..	0	0	32	2.9	0	32	0.0	100.0
Arkansas	1,550	0	..	0	0	69	4.4	0	69	0.0	100.0
California	21,803	64	19	6	20	2,702	12.4	2,480	222	91.7	8.3
Colorado	2,390	5	2	2	4	345	14.4	263	82	76.2	23.8
Connecticut	3,986	18	3	2	9	601	15.3	414	187	68.9	31.1
Delaware	514	1	1	1	1	51	9.9	22	29	43.2	56.8
Florida	4,912	8	5	2	5	385	7.8	248	137	64.4	35.6
Georgia	3,320	8	2	2	2	64	1.9	5	59	7.8	92.2
Idaho	564	0	..	0	0	64	11.3	0	64	0.0	100.0
Illinois	12,211	21	2	1	12	638	5.2	414	224	64.9	35.1
Indiana	4,364	8	1	1	8	259	5.9	94	165	36.3	63.7
Iowa	2,715	13	2	2	13	780	28.7	596	184	76.4	23.6
Kansas	2,199	25	1	1	15	688	31 3	608	80	88.4	11.6
Kentucky	2,581	1	1	1	1	123	4.7	30	93	24.4	75.6
Louisiana	3,387	7	2	2	7	111	3.3	26	85	23.4	76.6
Maine	978	1	1	1	1	46	4.7	0	46	0.0	100.0
Maryland	3,824	3	2	1	3	267	7.0	74	193	27.7	72.3
Massachusetts	8,701	38	12	3	18	618	7.1	456	162	73 8	26.2
Michigan	8,118	15	1	1	11	526	6 5	321	205	61.0	39.0
Minnesota	4,281	15	2	1	12	467	10.9	374	93	80.1	19.9
Mississippi	1,576	2	1	1	2	234	14.8	213	21	91.1	8.9
Missouri	4,752	2	2	1	2	521	10.9	8	513	1.6	98.4
Montana	629	0	..	0	0	36	5.7	0	36	0.0	100.0
Nebraska	1,515	13	3	2	12	439	29 0	327	112	74.5	25.5
Nevada	255	0	..	0	0	11	4.3	0	11	0.0	100.0
New Hampshire	771	0	..	0	0	37	4.8	0	37	0.0	100.0
New Mexico	647	0	..	0	0	63	9.7	0	63	0.0	100.0
New Jersey	6,825	12	3	1	9	1,047	15.3	632	415	60.4	39.6
New York	30,786	269	28	7	35	2,739	8.9	2,419	320	88.3	11.7
North Carolina	3,991	7	4	4	2	380	9.5	306	74	80.5	19.5
North Dakota	483	0	..	0	0	23	4.8	0	23	0.0	100.0
Ohio	10,986	23	10	3	12	1,191	10.9	775	416	65.1	34.9
Oklahoma	2,143	1	1	1	1	122	5.7	10	112	8.2	91.8
Oregon	2,142	10	2	1	9	329	15.3	247	82	75.1	24.9
Pennsylvania	14,507	22	8	2	11	729	5.0	285	444	39.1	60.9
Rhode Island	1,035	1	1	1	1	87	8.4	37	50	42.5	57.5
South Carolina	1,735	2	1	1	2	211	12.2	171	40	81.0	19.0
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Tennessee	3,466	3	3	2	3	138	4.0	44	94	31.9	68.1
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Vermont	550	10	1	1	3	64	11.6	38	26	59.4	40.6
Virginia	3,677	1	1	1	1	258	7.0	143	115	55.4	44.6
Washington	3,269	5	3	1	4	354	10.8	146	208	58.7	41.3
West Virginia	1,671	0	..	0	0	58	3.5	0	58	0.0	100.0
Wisconsin	3,920	1	1	1	1	143	3.6	11	132	7.7	92.3
Wyoming	256	0	..	0	0	37	14.4	0	37	0.0	100.0
District of Columbia	2,417	14	5	1	10	197	8.1	149	48	75.6	24.4
Totals		695	..	73	..	19,702	...	...	...	...	...

Despite the foregoing reservations regarding lack of perfection in the study, it should be emphasized that such a large percentage of the total enrollments and total number of courses is represented that it would seem reasonable to place considerable confidence in the validity of the over-all conclusions and hypotheses. However, this is the case only if

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16	Warm Springs, Ga.*
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18	Indianapolis
19	Des Moines, Iowa
20	Iowa City
21	Kansas City, Kan.
22	Louisville, Ky.
23	New Orleans
24	Shreveport, La.
25	Waterville, Maine*
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28	Brewster, Mass.*
29	Southbridge, Mass.‡
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56	Nashville, Tenn.
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62	Lubbock, Texas†
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Totals		695	..	73	..	19,702	...	...	...	...	...

Despite the foregoing reservations regarding lack of perfection in the study, it should be emphasized that such a large percentage of the total enrollments and total number of courses is represented that it would seem reasonable to place considerable confidence in the validity of the over-all conclusions and hypotheses. However, this is the case only if [illegible] of the 73 "postgraduate [illegible] which geographical data were [illegible] that only 8 of the 73 [illegible] enrollments, while an additional [illegible] than 20 enrollments during the year. [illegible] having only local enrollments involved a total of 683 enrollments (table 4) (or 3% of the total enrollments) in 34 courses at 10 institutions. The eight centers having fewer than 20 enrollments in each had a total of 98 enrollments by physicians.

Of the 73 centers, maps were drawn for 50. In addition to the 15 centers having too few or entirely local enrollment as a reason for nonmapping, there were 6 centers whose enrollment was too widespread over the entire country or world for a map to reveal useful regionalization. These were Boston; Glen Cove and Roslyn, N. Y.; New York City; Oak Ridge, Tenn.; Salt Lake City; and St. Louis (whose hospital alumni day remained in the study). The course of one "center" (Southbridge, Mass.) actually took place in New York City and the enrollments

TABLE 4.—*Number of Enrollments,*

	No. of Physicians Enrolled from State	New England								Middle Atlantic								South Atlantic																
[illegible]		Me.	Conn.		Mass.		N.H.	R.I.	Vt.	N.Y.					N.J.	Pa.		Del.	Md.	D.C.	Va.	W.Va.	N.C.				S.C.	Ga.		Fla.		Ala.	Ky.	Mi
Code No.		25	10	11	27	28	..	73	68	37	38	39	40	41-43	36	53	54	12	26	72	69	..	44	45	46	47	55	15	16	13	14	01	22	2
Maine	16	..	1	..	21	..	..	..	1	12	..	..	1	..	..	6	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Connecticut	389	..	105	9	34	..	..	1	5	93	..	..	5	..	..	23	1	..	..	15	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Massachusetts	921	..	29	1	418	19	..	3	25	41	..	9	12	..	..	11	5	..	..	19	..	..	..	..	1	..	..	..	..	2	..	..	..	..
New Hampshire	27	..	..	..	25	..	..	..	3	4	..	..	2	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Rhode Island	50	..	..	..	25	..	..	37	2	14	..	..	2	..	..	2	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Vermont	61	..	9	..	4	..	..	..	38	6	..	..	..	..	..	6	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
New York	2,738	..	2	..	52	..	..	..	10	1,503	32	219	278	395	..	67	3	..	..	92	1	..	..	..	1	..	..	1	..	2	..	..	..	..
New Jersey	1,047	..	..	..	15	..	..	..	3	244	..	..	2	..	632	84	3	..	..	30	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pennsylvania	729	..	..	..	37	..	..	..	2	139	1	..	71	3	..	255	30	..	..	76	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Delaware	51	..	..	..	1	..	..	..	..	5	..	..	1	..	..	13	..	22	..	2	..	..	..	1	..	..	..	..	..	1	..	..	..	..
Maryland	267	..	..	..	8	..	..	..	4	25	..	..	2	..	..	13	..	..	74	111	..	..	..	..	..	..	..	..	..	..	..	1	..	..
District of Columbia	197	4	..	..	1	..	..	..	..	19	..	..	..	..	..	4	..	..	..	149	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Virginia	258	..	..	..	8	..	..	..	..	28	..	..	1	..	..	7	1	..	..	48	143	..	..	1	..	..	..	..	..	..	..	1	..	..
West Virginia	58	..	..	..	5	..	..	..	1	13	..	..	1	..	..	6	..	..	..	3	2	..	..	..	..	..	..	..	..	..	..	..	..	..
North Carolina	380	..	..	..	7	..	..	..	..	21	..	..	..	..	..	4	..	..	..	22	..	..	40	103	97	66	2	..	..	..	..	..	..	..
South Carolina	211	..	..	..	3	..	..	..	..	7	..	..	..	..	..	1	..	..	..	11	..	..	..	2	6	..	171	..	..	..	..	..	..	..
Georgia	64	..	..	..	4	..	..	..	1	8	..	..	..	..	..	5	..	..	..	20	2	..	..	..	..	..	..	3	2	..	..	..	..	..
Florida	385	..	..	..	13	..	..	..	1	43	..	..	1	..	..	16	2	..	..	14	..	..	..	1	..	..	..	..	..	142	106	..	..	..
Alabama	70	..	1	..	8	..	..	..	..	8	..	..	..	..	..	7	1	..	..	12	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kentucky	123	..	..	..	5	..	..	..	..	15	..	..	..	..	..	5	2	..	..	13	..	..	..	..	..	..	..	..	1	..	..	..	30	..
Mississippi	234	..	..	..	1	..	..	..	..	1	..	..	..	..	..	2	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	213
Tennessee	138	..	..	..	6	..	..	..	..	24	..	..	..	..	..	8	..	..	..	28	..	..	..	..	..	..	..	..	2	..	..	..	..	..
Louisiana	111	..	..	..	3	..	..	..	..	12	..	..	..	..	..	3	..	..	..	13	..	..	..	..	2	..	..	..	..	..	..	..	..	5
Texas	1,273	..	..	..	13	..	..	..	..	24	..	..	..	..	..	11	..	..	..	35	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Minnesota	467	..	2	..	1	..	..	..	..	13	..	..	..	..	..	8	..	..	..	3	..	..	..	..	..	..	..	..	..	..	1	..	..	..
North Dakota	23	..	..	..	..	..	..	..	..	4	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..
South Dakota	32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Iowa	780	..	..	..	5	..	..	..	..	8	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..
Kansas	688	..	..	..	3	..	..	..	..	7	..	..	..	..	..	8	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nebraska	439	..	..	..	1	..	..	..	..	5	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Missouri	521	..	..	..	3	..	..	..	..	13	..	..	..	..	..	6	2	..	..	11	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Arkansas	69	..	..	..	4	..	..	..	..	3	..	..	..	..	..	2	..	..	..	6	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Oklahoma	122	..	..	..	2	..	..	..	..	4	..	..	..	..	..	1	..	..	..	5	..	..	..	..	..	..	..	..	..	2	..	..	..	..
Colorado	315	..	..	..	3	..	..	..	..	14	..	..	..	..	..	6	..	..	..	11	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Illinois	359	..	..	..	13	..	..	..	2	29	..	..	3	..	..	10	2	..	..	16	..	..	..	..	2	..	..	..	..	..	..	..	..	..
Indiana	254	..	..	..	8	..	..	..	..	16	..	..	13	..	..	13	1	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	10	..
Michigan	526	..	..	..	20	..	..	..	3	53	7	..	5	..	..	18	5	..	..	11	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Ohio	1,191	..	..	..	19	..	..	..	..	84	..	..	58	..	..	48	13	..	..	30	..	..	..	..	..	..	..	..	..	1	..	..	..	..
Wisconsin	131	..	1	..	5	..	..	..	..	20	..	..	..	..	..	16	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Arizona	32	..	1	..	2	..	..	..	..	..	..	..	..	..	..	2	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..
New Mexico	63	..	..	..	3	..	..	..	..	1	..	..	..	..	..	..	..	..	..	6	..	..	..	1	..	..	..	..	..	..	..	..	..	..
Utah	43	..	..	..	1	..	..	..	..	5	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..
Wyoming	37	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nevada	11	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Idaho	64	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Montana	36	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Washington	354	..	..	..	2	..	..	..	..	6	..	..	..	..	..	3	1	..	..	8	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Oregon	329	..	1	..	2	..	..	..	..	3	..	..	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
California	2,702	..	4	..	16	..	..	..	..	43	..	..	..	..	..	13	2	..	..	34	..	..	..	..	..	..	..	..	2	2	..	..	..	..
From outside 48 States & D. C.		2	7	..	104	..	..	..	11	134	..	..	111	..	7	29	2	..	..	73	..	..	..	..	2	..	..	4	6	59	..	5	..	..
Total		6	463	10	935	19	..	41	112	2,781	40	228	572	398	639	747	77	22	74	956	148	..	40	110	112	66	173	10	13	212	107	7	40	219

were so treated. However, the center number had already been assigned to Southbridge and so it is listed in table 2.

Table 3 presents the basic data from which the rank orders of tables 9 through 11 were obtained. Table 4 shows the geographical source of the 19,702 enrollments from states arranged by region (rather than alphabetically) along the left side to each side to each of the 72 centers similarly arranged by region along the top of the table. It should be noted *that table 4 presents the entire geographical data if only state boundaries are considered, although* the maps rather than table 4 are required to obtain the travel distance information. Physicians may cross a state line, such as from Kansas City, Mo., to Kansas City, Kans., without traveling more than a few blocks to a few miles.

tates of Origin, at Seventy-three Centers

outh Central								Central										North Central							Western							Pacific								
Tenn.		La.		Texas	Minn.	N. D.	S. D.	Iowa		Kan.	Neb.		Mo.	Ark.	Okla.	Colo.		Ill.	Ind.	Mich.	Ohio			Wis.	Ariz.	N. M.	Utah	Wyo.	Nev.	Ida.	Mont.	Wash.	Ore	Calif.						Totals
56	57	23	24	58-66	31	..	..	19	20	21	34	35	33	..	51	08	09	17	18	30	18	49	50	71	..	..	67	..	..	..	..	70	52	02	03	04	05	06	07	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	46
..	..	..	..	3	..	..	..	..	..	1	..	..	1	..	1	..	..	2	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	601
..	5	..	..	2	..	..	..	..	..	3	..	..	6	..	..	..	..	3	..	..	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	618
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	37
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	87
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	64
..	6	..	..	9	..	..	..	..	..	2	..	..	4	..	..	..	2	35	1	3	2	11	3	..	..	..	..	..	..	..	..	1	..	..	..	2	..	..	..	2,739
..	..	1	..	..	..	..	..	..	..	..	..	..	4	..	..	..	3	18	..	..	1	3	2	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	1,047
5	2	3	..	3	..	..	..	..	1	2	..	..	9	..	..	..	5	23	1	2	2	48	2	..	..	..	1	..	..	..	..	..	..	1	..	2	..	..	..	729
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	51
..	3	..	..	5	..	..	..	..	..	1	..	..	3	..	..	..	..	4	..	2	3	2	2	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	267
..	1	..	..	2	..	..	..	..	..	1	..	1	4	..	..	..	..	2	..	..	1	3	1	..	..	..	..	..	..	..	..	..	..	1	..	2	..	..	..	197
1	..	..	1	2	..	..	..	..	..	..	..	..	2	..	1	..	..	2	2	1	1	1	..	..	..	..	..	..	..	..	..	1	..	..	..	5	..	..	..	258
1	..	..	..	2	..	..	..	..	..	4	..	..	1	..	..	..	1	2	..	3	..	12	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	58
..	4	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	2	5	1	1	2	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	380
2	..	1	1	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	211
3	..	4	..	1	..	..	..	..	2	1	..	..	..	..	1	..	2	3	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	64
3	..	5	2	6	..	..	..	..	..	2	..	..	7	..	..	..	1	13	..	..	..	..	3	..	..	..	1	..	..	..	..	..	..	3	..	..	..	..	..	385
7	..	4	1	5	..	..	..	..	..	1	..	..	4	..	..	..	..	6	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	3	..	..	..	70
4	..	1	..	1	..	..	..	..	..	..	..	1	1	..	..	..	6	12	1	7	6	5	2	..	..	..	..	..	..	..	..	..	..	..	..	5	..	..	..	123
..	..	6	..	4	..	..	..	..	..	2	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	234
39	5	..	..	4	..	..	..	..	..	3	..	..	6	..	1	..	4	5	..	1	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	138
..	..	19	7	25	..	..	..	..	..	4	..	..	6	..	1	..	2	3	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	111
2	1	6	8	1,051	..	..	..	..	1	37	..	2	2	..	3	..	41	12	3	1	3	2	..	..	..	..	1	..	..	..	..	2	..	7	..	5	..	..	..	1,273
..	..	..	1	5	374	..	..	..	3	17	1	4	2	..	2	..	12	15	..	2	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	467
..	..	..	..	..	..	..	..	..	1	6	..	..	..	..	..	..	5	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	23
..	..	..	..	..	..	..	..	..	1	5	1	11	..	..	..	..	6	4	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	32
1	2	..	..	1	..	..	..	126	470	92	1	25	12	..	2	..	10	15	..	3	..	..	..	1	..	..	2	..	..	..	..	..	..	1	..	..	..	..	..	780
..	1	1	..	4	..	..	..	..	..	608	..	..	2	..	3	..	31	8	..	1	1	1	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	688
..	1	..	..	1	..	..	..	..	5	65	189	138	4	..	..	..	17	5	..	2	..	1	..	..	..	..	..	..	..	..	..	1	..	..	..	2	..	..	..	439
2	..	..	..	..	..	..	..	..	..	445	..	2	8	..	3	..	19	2	..	..	..	..	1	..	..	..	1	..	..	..	..	1	..	1	..	1	..	..	..	521
..	..	3	1	14	..	..	..	..	..	21	..	..	4	..	4	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	69
..	..	3	1	3	..	..	..	..	..	58	..	..	4	..	10	..	14	10	2	..	..	2	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	122
..	..	..	..	2	..	..	..	..	1	27	..	..	5	..	1	18	245	4	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	2	..	4	..	..	..	345
4	4	4	..	6	..	..	..	..	22	26	..	..	17	..	..	..	17	414	2	5	6	6	4	15	..	..	..	..	..	..	..	..	..	7	..	2	..	..	..	638
1	..	4	..	3	..	..	..	..	3	6	..	..	9	..	3	..	12	25	94	7	8	13	3	..	..	..	1	..	..	..	..	..	..	1	..	1	..	..	..	259
..	..	3	..	5	..	..	..	..	1	11	..	3	6	..	2	..	14	19	3	321	1	10	2	..	..	..	..	..	..	..	..	1	..	1	..	1	..	..	..	526
3	7	..	1	10	..	..	..	..	..	13	..	4	20	..	..	..	8	24	2	67	385	312	78	..	..	..	2	..	..	..	..	..	..	..	..	2	..	..	..	1,191
1	2	1	..	..	..	..	..	..	3	10	..	1	4	..	2	..	11	37	..	7	3	1	2	11	..	..	..	..	..	..	..	..	2	1	..	..	..	..	..	143
..	..	1	1	2	..	..	..	..	..	3	..	..	..	..	..	..	5	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	8	..	4	..	..	..	32
..	..	1	..	17	..	..	..	..	..	5	..	..	2	..	1	..	22	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	2	..	1	..	..	..	63
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	23	..	..	..	..	..	..	..	..	..	3	..	..	..	..	..	..	3	..	6	..	..	..	43
..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	29	1	..	1	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	37
..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	3	..	..	..	11
..	..	..	..	4	..	..	..	..	..	..	..	..	2	..	..	..	5	1	..	..	..	..	..	..	..	..	1	..	..	..	..	4	37	2	..	3	..	..	..	64
..	..	1	..	1	..	..	..	..	..	1	..	..	..	..	..	..	11	2	..	..	1	..	..	..	..	..	2	..	..	..	..	1	9	1	..	3	..	..	..	36
..	..	..	..	3	..	..	..	..	1	1	..	3	..	..	..	..	16	1	..	..	1	..	..	..	..	..	..	..	..	..	..	146	138	10	..	14	..	..	..	354
..	..	..	..	..	..	..	..	..	..	..	..	3	1	..	1	..	19	1	1	..	..	..	..	..	..	..	..	..	..	..	..	18	247	14	..	16	..	..	..	329
..	1	..	..	9	..	..	..	..	3	2	..	3	5	..	..	..	36	7	..	..	3	1	13	..	..	..	6	..	..	..	..	9	8	1,023	347	892	168	15	35	2,702
1	27	..	1	3	..	..	..	..	..	1	..	..	..	..	2	..	5	14	2	28	2	3	3	..	..	..	3	..	..	..	..	17	41	6	..	15	..	..	..	730
80	72	72	26	1,219	374	..	..	126	519	1,488	195	202	172	..	44	18	608	768	118	469	438	446	122	28	..	..	26	..	..	..	..	206	482	1,097	348	1,014	168	15	35	20,432

Since the geogpraphical aspect of this study was devoted chiefly to the 19,702 enrollments from the 48 states and District of Columbia (Alaska not then being a state), it might be noted in passing *that those centers having the greatest enrollment*

TABLE 5.—*Scheduled Courses Given by Category and Geographical Location*

	1 Allergy	2 Anatomy	3 Anesthesiology	4 Basic Sciences	5 Cardiovascular Disease	6 Clinical Pathology	7 Dermatology	8 Electrocardiography	9 Electroencephalography	10 Endocrinology	11 Endoscopy	12 Forensic Medicine	13 Fractures	14 Gastroenterology	15 General Practice	16 Gynecology	17 Hematology	18 Internal Medicine	19 Malignant Disease	20 Neurology	21 Neurology and Psychiatry	22 Obstetrics	23 Obstetrics and Gynecology	24 Occupational Medicine	25 Ophthalmology	26 Ophthalmology and Otolaryngology	27 Orthopedic Surgery	28 Otolaryngology	29 Pathology	30 Pediatrics	31 Peripheral Vascular Disease	32 Physical Medicine Rehabilitation	33 Physiology	34 Poliomyelitis	35 Proctology	36 Psychiatry	37 Psychosomatic Medicine	38 Public Health	39 Pulmonary Disease	40 Radiology	41 Surgery	42 Urology	Total
Maine	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Connecticut	..	2	..	..	..	..	..	2	1	1	..	..	..	..	..	..	..	..	..	4	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	3	..	..	..	3	..	..	18
Massachusetts	..	..	..	..	3	..	..	5	..	..	..	..	1	1	4	2	..	6	1	2	1	1	..	..	..	..	1	..	..	5	..	..	..	1	..	1	..	..	..	1	2	..	38
New Hampshire	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Rhode Island	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Vermont	..	..	..	..	1	..	..	5	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10
New York	3	12	5	..	14	..	4	14	1	4	1	..	1	6	24	6	5	26	..	1	1	3	4	7	10	1	3	6	5	15	5	5	3	..	4	43	2	..	2	12	11	..	269
New Jersey	..	..	1	..	2	..	..	..	..	1	..	..	..	..	..	..	..	2	..	..	..	2	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	1	1	..	12
Pennsylvania	..	..	2	..	2	..	..	2	..	..	..	..	..	1	1	..	2	1	..	1	..	..	1	..	..	..	..	1	1	3	..	1	..	..	..	..	..	..	3	..	..	..	22
Delaware	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Maryland	..	1	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3
District of Columbia	..	..	..	..	1	..	..	..	..	..	..	1	..	..	1	..	..	1	..	..	..	..	..	..	1	..	..	..	3	..	..	..	..	..	..	1	..	..	..	2	2	1	14
Virginia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
West Virginia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
North Carolina	..	..	..	..	..	..	..	2	..	..	..	..	..	..	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7
South Carolina	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
Georgia	..	..	..	..	..	6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	8
Florida	..	1	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	1	..	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	8
Alabama	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Kentucky	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1
Mississippi	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
Tennessee	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	3
Louisiana	..	..	..	..	..	..	1	1	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	7
Texas	1	2	3	1	..	..	1	2	..	1	..	..	..	2	9	..	..	5	2	2	..	1	..	..	..	..	1	2	..	..	..	..	..	..	2	1	..	..	2	3	1	..	44
Minnesota	..	..	..	..	1	..	1	1	..	..	..	..	1	..	2	1	..	1	..	1	..	1	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	2	1	15
North Dakota	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
South Dakota	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Iowa	..	..	..	..	1	..	1	1	..	..	..	..	..	1	1	..	1	..	1	1	..	..	1	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	..	1	..	1	13
Kansas	..	..	2	..	3	..	..	1	..	..	..	..	..	1	3	..	2	1	..	1	..	..	1	..	..	1	..	..	..	1	..	1	..	..	..	..	..	..	3	2	2	..	25
Nebraska	..	..	..	..	..	..	..	1	..	..	..	..	..	1	1	..	1	2	1	..	..	1	1	..	..	..	..	..	..	1	..	..	..	..	..	1	..	1	1	..	..	..	13
Missouri	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
Arkansas	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Oklahoma	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Colorado	..	..	..	..	..	..	..	1	..	..	..	..	..	1	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	5
Illinois	1	..	1	..	..	..	..	1	..	..	1	..	2	..	7	..	..	1	..	..	..	..	..	..	2	..	..	2	..	..	..	1	..	..	..	1	..	..	1	..	..	..	21
Indiana	..	..	..	..	..	..	..	1	..	..	..	..	1	1	..	..	1	1	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	..	1	..	..	..	8
Michigan	..	..	..	..	2	..	..	..	..	..	..	..	..	1	..	..	1	4	..	..	..	..	1	..	1	..	..	1	..	1	..	..	..	..	..	..	..	..	1	1	1	..	15
Ohio	..	..	..	..	..	1	..	..	..	..	..	..	..	..	3	..	..	2	..	..	..	1	1	4	2	1	..	1	..	2	..	..	..	..	..	..	1	..	..	3	1	..	23
Wisconsin	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Arizona	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
New Mexico	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Utah	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
Wyoming	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Nevada	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Idaho	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Montana	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Washington	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	2	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	5
Oregon	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	1	..	..	..	1	..	1	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..	10
California	..	9	..	..	5	..	1	..	..	2	..	..	1	..	7	1	..	11	1	..	..	..	..	1	4	..	2	1	..	2	..	..	1	2	..	3	..	..	1	1	7	1	61
Totals	5	28	14	2	36	8	9	43	2	11	2	1	7	16	75	10	16	77	7	14	3	10	11	14	23	4	8	18	12	36	5	8	4	5	8	54	3	1	16	32	33	4	695

from Canada and other countries were as follows: Boston, New York City, and Buffalo each had more than 100 such enrollments, and the District of Columbia and Miami each had more than 50. It is probable, on the basis of other information, that Philadelphia would be included in this group if the Graduate School of Medicine of the University of Pennsylvania had reported its out-of-country enrollments. There were a total of 730 enrollments from Canada and other countries in this study, or 3.5% of the total enrollments.

Table 5 presents the number of courses by state and category of subject matter as derived from the title of the course and any accompanying literature. The states were arrayed regionally in order that a clear picture of the geographical distribution of the subject matter could be obtained. Because the significance of the information in table 5 is more apparent in relation to the mobility of physicians and their demonstrated travel to courses over relatively large distances, discussion of the subject category information will be found later in this report.

Physician Mobility Marked

In table 6 is presented travel distance information obtained for enrollments to the 50 centers for which maps were prepared. The number of enrollments coming from considerable distances should be noted. It should be remarked that not all of the enrollments to any of the centers could be located on a map of the region, some having come from more distant places. Thus, in consulting this table, attention should be paid to the actual proportion of the total enrollments that were mapped to each center. The difference between that figure and 100% would represent travel from a greater distance. Although the maps were originally conceived to show regionalizations of postgraduate medical education, their more important uses in most instances were as a means of determining actual distances traveled by physicians enrolling in courses.

Table 7 presents the average travel distances in rank order from least to greatest. It, again, refers only to that proportion of the enrollment to each center that was mapped. The average travel distances were much larger than would have been anticipated.

By combining the information from the several states that compose a generally recognized region—such as California, Washington, and Oregon for the Pacific Region—table 8 was prepared. It was expected that this kind of grouping might show regional differences in willingness to travel, which to a degree it does. It serves better to emphasize the mobility of physicians throughout the country to postgraduate courses.

The evidence of physician travel over relatively large distances to enroll in postgraduate courses is one of the most important and least expected results of this study. It places the needs in this phase of education and the manner of meeting those needs in an entirely different dimension than if one assumes, as most have done in the past, that educational opportunities must be near to physicians if they are to take advantage of them. It also makes it evident that planning to meet the needs of physicians in their continuation education should not be

TABLE 6.—*Travel Distances of Physicians Enrolled in Courses*

			Distance Traveled, Mi.									
Code No.	Course Center	From City	0-50	50-100	100-150	150-200	200-300	300-500	500-700	Over 700*	Average	% Enrollment Mapped and Comprising Foregoing
02	Los Angeles	365	166	170	48	23	16	47	13	23	87	79.3
03	Carmel & Monterey, Calif.	63	85	50	65	37	30	1	..	..	85	95.1
04	San Francisco ...	460	145	119	28	1	24	57	19	2	66	84.3
05	Fresno, Calif.	69	34	35	20	5	3	..	..	..	46	98.8
07	Santa Barbara, Calif.	10	17	6	1	..	..	..	..	..	29	97.1
09	Denver, Colo.	161	18	46	22	18	40	79	22	11	171	62.4
10	New Haven, Conn.	148	166	32	1	..	..	..	..	..	19	70.4
13	Miami, Fla.	139	3	..	..	..	..	..	..	..	..	67.0
14	Jacksonville, Fla.	71	5	2	8	4	9	7	..	..	63	99.1
17	Chicago	81	32	32	20	3	1	..	..	..	38	35.5
18	Indianapolis	12	32	32	20	3	1	..	..	..	65	84.7
19	Des Moines, Iowa	60	27	17	8	..	..	..	..	..	26	88.9
20	Iowa City	43	100	177	123	44	16	..	..	..	85	96.9
21	Kansas City, Kan.	329	156	106	122	236	147	56	27	..	119	79.0
22	Louisville, Ky. ...	20	17	1	2	..	..	..	..	..	19	100.0
23	New Orleans	8	2	5	2	2	6	10	5	1	249	56.9
24	Shreveport La. ..	1	0	1	2	6	4	2	0	1	231	65.4
26	Baltimore, Md. ..	69	5	..	..	..	..	..	..	..	2	100.0
30	Ann Arbor, Mich.	24	184	101	62	22	19	6	..	..	73	89.1
32	Jackson, Miss. ...	109	19	46	18	9	..	..	..	..	38	91.7
34	Lincoln, Neb.	8	28	63	29	15	19	30	..	..	140	98.5
35	Omaha	25	40	55	32	20	6	..	..	..	79	88.1
36	Jersey City, N.J..	359	246	26	1	..	..	..	..	..	13	98.8
39	Albany, N.Y.	80	82	52	5	..	2	7	..	..	42	100.0
40	Buffalo	55	86	66	52	56	77	15	..	..	118	71.1
42	Rochester, N.Y. ..	17	46	28	..	15	..	..	..	..	55	95.5
43	Syracuse, N.Y. ...	34	35	58	12	2	2	..	..	..	53	97.3
44	Asheville, N.C. ...	24	13	2	..	..	..	..	..	..	12	97.5
45	Chapel Hill, N.C.	7	20	26	38	11	7	..	..	..	100	99.1
46	Charlotte, N.C. ..	70	10	18	6	..	..	..	..	..	22	92.9
47	Morgantown, N.C.	23	40	..	1	..	..	..	..	..	17	97.0
48	Cincinnati	354	28	8	1	..	8	..	..	..	8	91.0
49	Cleveland	210	44	37	46	18	10	20	..	..	60	86.0
50	Columbus, Ohio .	20	15	15	19	1	6	..	..	..	73	62.3
51	Oklahoma City ..	6	2	2	..	6	5	2	..	..	143	52.3
52	Portland, Ore. ...	116	61	43	64	23	57	33	6	..	116	87.8
53	Philadelphia	146	90	103	24	8	35	49	..	..	95	69.9
54	Pittsburgh	25	..	1	4	..	8	3	..	..	88	53.2
55	Charleston, S.C.	77	3	24	38	23	6	..	..	..	71	99.0
56	Nashville, Tenn. .	7	13	14	9	6	7	2	..	..	103	72.5
60	El Paso & Ft. Bliss, Texas	49	1	1	4	1	4	2	1	..	50	92.6
61	Houston, Texas .	162	37	44	40	82	116	56	17	..	149	88.9
65	Temple, Texas ...	5	4	5	4	3	6	3	..	..	135	46.9
64	San Antonio, Texas	162	21	31	38	2	14	4	..	..	48	87.9
66	Texarkana, Texas	10	9	3	..	..	..	..	..	..	20	100.0
68	Burlington, Vt. ..	18	9	11	14	20	3	..	..	..	94	67.0
69	Charlottesville, Va.	6	37	59	30	3	3	1	..	..	77	93.9
70	Seattle & Tacoma	66	62	6	14	4	12	3	..	..	52	81.9
71	Madison, Wis. ...	1	3	15	5	..	..	..	..	..	76	85.7
72	Washington, D.C.	48	65	11	71	38	103	3	..	..	132	36.4

* Within the region.

confined to the locality or even the state or region in which the physicians practice, within certain limits as will be set forth when the "threshold factor" is considered. The educational opportunities in Ohio and Tennessee are important for Kentucky physicians, for instance, as are also the courses offered in much more distant places.

There is an interesting correlation between the presence of a medical school active in postgraduate courses and the distance from which enrollments in those courses came. With four exceptions, all 32 cities (or 87.5%) drawing enrollments from an average travel distance greater than 50 miles (table 7) have medical schools active in postgraduate courses. The four exceptions are in California, Texas, and Louisiana, where travel distances tend to be greater. However, only 8 (44%) of the 18 cities drawing from an average of 50 miles or less have medical schools. Those eight cities are in regions of the country where people are more reluctant to travel distances greater than 50 miles. The 10 cities having no medical schools and drawing enrollments with an average travel distance of 50 or fewer miles are in nine instances located in regions usually showing the greatest travel—Iowa, North Carolina, Texas, and California.

TABLE 7.—*Average Distances Traveled to Course Centers*

Course Center	Miles, No.
Miami, Fla	0.5
Baltimore, Md.	2
Cincinnati	8
Asheville, N. C.	12
Jersey City, N. J.	13
Morgantown, N. C.	17
Louisville, Ky.	19
New Haven and Middleton, Conn.	19
Texarkana, Texas	20
Charlotte, N. C.	22
Des Moines, Iowa	26
Santa Barbara, Calif.	29
Chicago	38
Jackson, Miss.	38
Albany, N. Y.	42
Fresno, Calif.	46
San Antonio, Texas	48
El Paso and Fort Bliss, Texas	50
Seattle and Tacoma	52
Syracuse, N. Y.	53
Rochester, N. Y.	55
Cleveland	60
Jacksonville, Fla.	63
Indianapolis	65
Oakland, San Francisco, Santa Rosa, Martinez, and Castro Valley	66*
Charleston, S. C.	71
Columbus, Ohio	73
Ann Arbor, Mich.	73
Madison, Wis.	76
Charlottesville, Va.	77
Omaha	79
Iowa City	85
Carmel and Monterey, Calif.	85
Laguna Beach, Duarte, and Los Angeles	87
Pittsburgh	88
Burlington, Vt.	94
Philadelphia, Pa.	95
Chapel Hill, N. C.	100
Nashville, Tenn.	103
Portland, Ore.	116
Buffalo, N. Y.	118
Kansas City, Kan.	119
Washington, D. C.	132
Temple, Texas	135
Lincoln, Neb.	140
Oklahoma City	143
Houston, Texas	149
Denver	171
Shreveport, La.	231
New Orleans	249

* Median distance.

Twenty-two (88%) of 25 cities that are above the median average distance traveled (68.5 miles) have one or more medical school active in postgraduate medical education. Only 14 cities (56%) of the 25 that are below the median average travel distance of enrollments have one or more medical schools active in postgraduate courses.

There seems to be a significant correlation between the courses offered by medical schools and the willingness of those in the profession to travel over considerable distances to enroll in those courses. One is tempted to infer from this a qualitative factor that is appealing to the profession.

The Threshold Factor

If comparison is made between tables 9 and 10 and between tables 9 and 11, an interesting correlation appears. Those states (28) having zero to three course subjects in the state are below the median (211) in originating postgraduate course enrollments to anywhere in the United States, with the following five exceptions: Maryland (which is close to Washington, D. C., and Philadelphia), Mississippi (which is only barely above the median enrollment), Missouri (which is immediately adjacent to Kansas on whose eastern border are given many more than the median number of course subjects), North Carolina (whose circuit courses are not counted in this study), and Virginia (which is also close to Baltimore, Philadelphia, and Washington, D. C.). Thus all of the exceptions are susceptible of explanation.

On the contrary, those states (21) having four or more course subjects in the state are above the median in originating postgraduate course enrollments throughout the nation, except the following: District of Columbia (where many of the courses are by and designed for the military doctor) and Louisiana. The explanation for the latter exception is not clear.

There is also a positive correlation between the number of course subjects offered in a region to the number of physician enrollments from that region to courses anywhere in the United States. The correlation that was pointed out for each state holds even truer for geographical regions.

To demonstrate the correlations just described, the graph in figure 3 was prepared. As the graph in figure 4 shows, it is not possible to correlate the number of course subjects in a state or region with enrollment in that state or region.

It thus appears that there may be in postgraduate medical education a factor which could appropriately be termed the "threshold factor," because its effect seems to be analogous to the galvanic threshold or rheobase found in physiology. It seems that if the "threshold dose" of postgraduate medical education in terms of subject matter variety of courses is offered in a state or geographical region, physicians are sufficiently stimulated or challenged to almost "explode outward" in enrolling in postgraduate courses throughout the country. The "threshold stimulus" appears to be about four subjects per year in a region or state. This would not be an impracticable basis for inducing more of the profession to participate in continuing education.

It is, however, a repeated experience in statistical analysis—in fact a part of the working philosophy of scientists—that positive or negative correlations, no matter in what degree, do not themselves establish cause and effect relationships. Thus, it is entirely possible that the "threshold factor" is an unwarranted assumption based on positive correlation rather than on a true cause-effect relationship. Certainly it would be unrealistic to suppose that mere number of course subjects, without regard to their quality of educational experience and out of context with the needs of the profession, would be likely to stimulate physician enrollments in other postgraduate courses. The fact that the qualitative factor is important in education requires no statistical support. In addition, however, it may be that a certain minimal availability of educational experiences stimulates further educational activities requiring more effort, such as travel.

TABLE 8.—*Numbers and Percentages of Enrollments to Courses by Travel Distance*

	To Pacific		To Midwest						To North Central		To South Central		To Middle Atlantic				To South Atlantic		To New England			
	Calif., Ore., & Wash.		Kan. & Iowa		Denver		Mo., Neb., & Okla.		Ill., Ind., Mich. Ohio, & Wis.*		Ky., Miss., La., Tenn., & Texas		Md., D.C., & Va.†		N.Y., N.J., & Pa.‡		N.C., S.C., & Fla.		Conn. & Vt.§		Totals	
Enrollment	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No	%	No.	%	No.	%
Total	3,350‖	...	2,133	...	668	...	613	...	2,389	...	1,595	...	1,178	...	5,342	...	820	..	585	...	18,673‖	...
Mapped¶	2,847	85	1,794	84.1	417	62.4	393	64.1	1,571	65.7	1,430	89.6	552	46.8	2,012	37.6	735	89.6	422	72.1	12,547	67.2
At distance from course, mi.																						
<50	1,719	60.4	715	39.9	179	42.9	109	27.7	1,040	66.2	788	55.1	230	41.6	1,301	64.6	505	68.8	341	80.8	7,301‡‡	58.2‡‡
50-100	429	15.0	300	16.6	46	11.0	120	30.5	240	15.3	151	10.6	70	12.6	334	16.6	72	9.8	43	10.2	1,805	14.4
100-200	353	12.4	533	29.7	40	9.6	102	25.9	220	14.0	230	16.1	142	25.6	179	9.1	129	17.6	35	8.3	1,963	15.6
200-300	142	5.1	163	9.1	40	9.6	30	7.6	45	2.8	157	10.9	106	19.2	124	6.1	22	2.9	3	0.7	832	6.6
>300	204	7.1	83	4.6	112	26.8	32	8.1	26	1.7	104	7.3	4	1.0	74	3.6	7	0.9	0	..	646	5.2
>300 (total)¶	...	21.1	...	20.5	...	50.0	...	44.0	...	*	...	17.7	...	†	...	‡	...	11.2	..	27.9	.	.

* t include those at Cook County Graduate School, which did not submit geographical information.
† .C., *were not mapped, as they came from the United States as a whole*
‡ were not mapped, as they came from the entire United States and foreign countries.
§ were in Boston and were not mapped as they came from the United States as a whole and other countries.
‖ al enrollments.
¶ n a contiguous area, usually involving several states. The difference between total enrollment and mapped enrollr distance, such as enrollments from Chicago in a New York City course. Where applicable, if these are added to enrol alles, the indicated percentages would result.
‡‡ Another ... l., Mass., N.Y., and Texas) were strictly local in origin, making 7,807 of 13,053 from less than 50 miles, or 59.7% for nation.

Relation of Medical Schools to Courses

With only one exception, the 11 states having no courses also did not have four-year medical schools, although four states did have two-year schools of the basic medical sciences. Such schools are usually not as active in the continuation education of physicians as are the four-year medical schools.

Without exception, the upper 63% (31 out of 49) of states having the greatest physician enrollment in postgraduate courses somewhere in the country also had one or more four-year medical schools. However, 69 of the 81 four-year medical schools (85%) are located in those 31 states.

Without exception, those states having more than the median number of course subjects (five or more) had one or more four-year medical schools located in those states. In fact, 51 of the 81 four-year medical schools are located in those 24 states. Without exception also, all states having three or more courses in the state had one or more four-year medical schools.

That a medical school in the state does not assure an adequacy of postgraduate courses, though it appears to be an important factor, is shown by the fact that 9 of the 23 states having two or fewer courses had four-year medical schools, and four additional such states had two-year schools of the basic medical sciences. However, only one of the 11 states in which there were zero courses reported had a four-year medical school, although four of those states did have two-year schools of the basic medical sciences in 1956-1957.

Reference has already been made to the relationship of medical schools to the distances from which enrollments are drawn to the courses offered.

The significance of medical school sponsorship in attracting enrollments in postgraduate courses can also be noted by comparing enrollments in two cities in the same state, one with a medical school and one without. Since Iowa has already been mentioned, one might take the case of Iowa City with its medical school as compared to Des Moines not having a medical school. All of the courses in Iowa

City were sponsored by and took place at the medical school. In Des Moines, two courses were reported, one in an auditorium outside of a hospital and the other in a nonschool hospital, though both courses were sponsored by hospitals. Only 29% of the enrollments in Des Moines came from cities from which enrollments did not also go to Iowa City. Or, to put it the other way, 71% of the enrollments to Des Moines came from cities from which physicians also enrolled in the medical school courses in Iowa City. While Des Moines courses drew almost entirely from central Iowa, the courses in Iowa City drew enrollments from throughout the whole state (fig. 1) as well as from eastern Nebraska, Minnesota, Wisconsin, northern Missouri, and Illinois.

TABLE 9.—*Postgraduate Course Enrollments, by State of Origin, Listed According to Rank*

State of Origin	Enrollments, No.	State of Origin	Enrollments, No.
New York	2,739	South Carolina	211*
California	2,702	District of Columbia	197
Texas	1,273	Wisconsin	143
Ohio	1,191	Tennessee	138
New Jersey	1,047	Kentucky	123
Iowa	780	Oklahoma	122
Pennsylvania	729	Louisiana	111
Kansas	688	Rhode Island	87
Illinois	638	Alabama	70
Massachusetts	618	Arkansas	69
Connecticut	601	Georgia	64
Michigan	526	Idaho	64
Missouri	521	Vermont	64
Minnesota	467	New Mexico	63
Nebraska	439	West Virginia	58
Florida	385	Delaware	51
North Carolina	380	Maine	46
Washington	354	Utah	43
Colorado	345	New Hampshire	37
Oregon	329	Wyoming	37
Maryland	267	Montana	36
Indiana	259	Arizona	32
Virginia	258	South Dakota	32
Mississippi	234	North Dakota	23
		Nevada	11
		Total	19,702

* Median number of enrollments.

Another striking comparison of the effect of courses in medical schools and medical centers as compared to courses having other sponsorship or location is the contrast between San Antonio and Houston, Texas, as well as between Temple and Houston, Texas. Considering only the enrollments from outside each city, 86% of the physician enrollments in courses at San Antonio came from cities from which physicians enrolled in courses in Houston. However, only 49% of the Houston enrollments came from cities from which physicians also enrolled in San Antonio courses. Further, while there were only two enrollments of physicians from Houston in San Antonio courses, there were 27 enrollments from San Antonio to Houston courses. There was an identical number of enrollments (162) in each city from physicians in the same city. While all of the Houston courses took place in medical school hospitals, the San Antonio courses were located in nonschool hospitals.

In contrasting Temple with Houston, it is noted that the two courses reported for Temple were located in nonschool hospitals. Only 14% came from places not also contributing enrollments to Houston.

It seems on the basis of information of this kind, together with the extreme mobility of physicians enrolling in postgraduate courses throughout the country, that reconsideration might well be given to the need or desirability of taking courses out to the profession in the form of circuit courses or remote operations by a medical school or postgraduate school. It is obviously more economical of limited faculty time in medical schools for the postgraduate courses to be located at the schools rather than in the hinterlands. It is also more frequently possible for such medical school and medical center courses to use active educational methods in addition to en masse lectures.

On the basis of the present study, it seems clear that physicians enrolling in postgraduate courses are willing to travel far greater distances than had previously been assumed, especially to courses sponsored by and located in medical schools. Therefore, there may not be nearly as great a need as has been thought previously for putting on what are often second-best courses "in the field" in order to reach physicians. It appears that of the practicing profession enrolling in postgraduate courses, many are willing to travel to medical schools over considerable distances even when nonschool courses are available nearby.

TABLE 10.—*Number of Courses per State, According to Rank*

	Courses, No.		Courses, No.
New York	269	Tennessee	3
California	64	Mississippi	2
Texas	44	Missouri	2
Massachusetts	38	South Carolina	2
Kansas	25	Alabama	1
Ohio	23	Delaware	1
Pennsylvania	22	Kentucky	1
Illinois	21	Maine	1
Connecticut	18	Oklahoma	1
Michigan	15	Rhode Island	1
Minnesota	15	Utah	1
District of Columbia	14	Virginia	1
Nebraska	13	Wisconsin	1
Iowa	13	Arizona	0
New Jersey	12	Arkansas	0
Oregon	10	Idaho	0
Vermont	10	Montana	0
Florida	8	Nevada	0
Georgia	8*	New Hampshire	0
Indiana	8	New Mexico	0
Louisiana	7	North Dakota	0
North Carolina	7	South Dakota	0
Colorado	5	West Virginia	0
Washington	5	Wyoming	0
Maryland	3		
		Total	695

* Median number of courses.

The possibility that circuit and other remote courses serve a stimulating function in arousing the interest of physicians in traveling to schools for additional courses cannot be verified or denied on the basis of this study.

In order that the institutions and organizations who supplied enrollment information may have the full benefit of the information obtained, copies of the maps for their general region of the country will be mailed to each institution and organization active in postgraduate medical education. The publication of all 50 maps in this study is not feasible here.

Subjects of Courses

The 42 categories under which postgraduate courses were listed in 1956 are arrayed across the top of table 5, and the states are arranged regionally along the left, with the number of courses given in the appropriate column intersections. The table thus portrays at a glance the regions of the country generally lacking in many subject categories as well as those relatively completely supplied.

When this kind of tabulation was first contemplated, it was at an early stage of the study before it was realized how much and how far physicians traveled to enroll in postgraduate courses. It was thought that such a tabulation of course subject categories would assist in determining the needs in each state. The preceding data makes it abundantly clear that the table would be better utilized as indicating the subject matter needs in each general region of the country, comprising several states. For that reason, the states are arrayed in the table by regions geographically rather than alphabetically.

Canceled Courses Not Unique

The 226 courses that were canceled in the 1956-1957 year, usually because of lack of enrollment by physicians, were analyzed as to their gross characteristics. It was hoped that clues would emerge from those casualties which would be of assistance in planning in the future. Comparison of the gross characteristics of the 226 canceled courses with the characteristics of the courses actually given showed no significant differences in terms of sponsorship (medical school, nonschool hospital, medical society, etc.), educational methods, location (medical school, non-school hospital, hotel, etc.), kind of course (continuous versus intermittent), and those for whom the courses were designed (general practitioner or full time specialist or both). Thus, the gross characteristics of the courses did not appear to relate to whether or not they attracted sufficient physician attention to be actually given.

TABLE 11.—*Number of Course Subjects, per State, According to Rank*

	Subjects, No.		Subjects, No.
New York	35	Mississippi	2
California	20	Missouri	2
Texas	20	North Carolina	2
Massachusetts	18	South Carolina	2
Kansas	15	Alabama	1
Pennsylvania	14	Delaware	1
Iowa	13	Kentucky	1
Illinois	12	Maine	1
Minnesota	12	Oklahoma	1
Nebraska	12	Rhode Island	1
Ohio	12	Utah	1
Michigan	11	Virginia	1
District of Columbia	10	Wisconsin	1
Connecticut	9	Arizona	0
New Jersey	9	Arkansas	0
Oregon	9	Idaho	0
Indiana	8	Montana	0
Louisiana	7	Nevada	0
Florida	5*	New Hampshire	0
	4	New Mexico	0
	4	North Dakota	0
	3	South Dakota	0
Tennessee	3	West Virginia	0
Vermont	3	Wyoming	0
Georgia	2		

* Median number of subjects in states with courses.

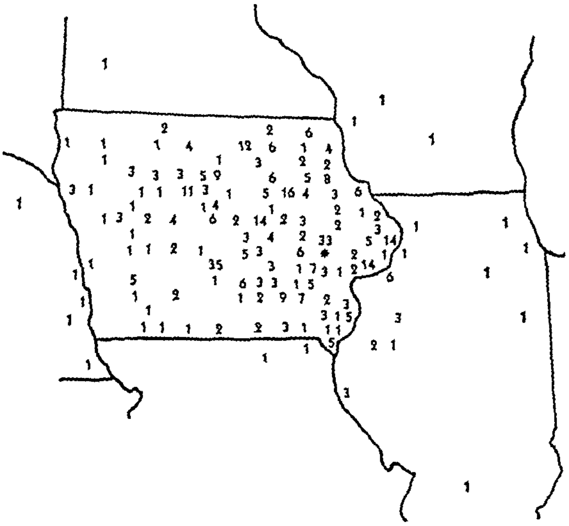

Fig. 1.—Map of enrollments in courses at Iowa City. Eleven courses were sponsored by one institution; 519 physicians registered, including 43 from Iowa City.

However, when the location of the canceled courses and their subject matter was compared with the location of courses actually given, the reason for cancelation became evident. In almost all cases, the courses canceled were in regions and on subjects in which other courses occurred. In fact, 191, or 84%, of the canceled courses were in the states ranking highest in the total number of courses given (New York, Massachusetts, Texas, Pennsylvania, and California). It was extremely rare for a course to be canceled if it was on a subject not already covered by other courses in the region. In those exceptional instances it is possible that the conflict was with dates scheduled, although the data in the study was not in such a form as to confirm or deny this assumption.

Table 8 reveals that at least one-fifth of the enrollments in each of the 10 regions were by physicians from a distance of 50 to 200 miles. Indeed, for the country as a whole, of the two-thirds of the enrollments that were mapped, almost one-third came from distances of 50 to 200 miles. In two of the regions, about one-half of the mapped enrollments came from 50 to 200 mile distances, and an additional five regions showed more than one-fourth of the enrollments from that distance. Even more impressive is the fact that in two of the regions, about half of the enrollments came from distances greater than 300 miles; one region had more than one-fourth its enrollments from distances greater than 300 miles, and an additional three regions had about one-fifth of the enrollments from such distances.

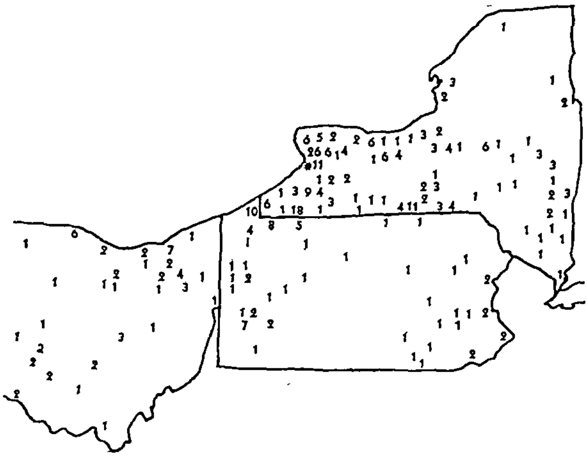

Fig. 2.—Map of enrollments in courses at Buffalo. Thirteen courses were sponsored by one institution; 572 physicians registered, including 55 from Buffalo.

The enrollments to New York City, Boston, and Washington, D. C. were not mapped, as they came from the entire United States and abroad. If the travel to those cities were included as related to postgraduate courses, then the mobility of physicians would be magnified rather than diminished. Without those figures in the travel distance study, it is likely that the tables present more realistic information of travel as it is directly related to continuation education. It is generally recognized that the above three metropolitan centers offer many attractions in addition to postgraduate courses. However, the courses at Denver that were in the study and in the mapping did not occur during the vacation season of June to September, when attractions other than education might be thought as possibly predominant.

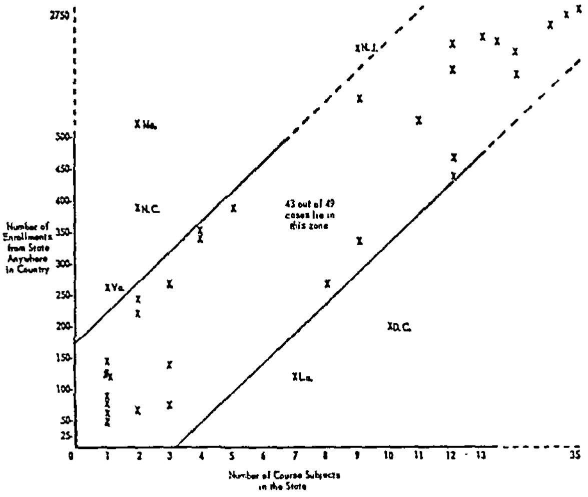

Fig. 3.—Graph showing correlation between number of postgraduate courses in specific region and enrollment of physicians from anywhere in the United States.

Careful study of table 4 also reveals the extreme mobility of large numbers of the enrollments in postgraduate courses. It might be thought that travel over comparatively large distances would involve only courses lasting a week or more. Such is not necessarily the case. The map in figure 1 shows enrollments for Iowa City. In that instance, only one institution is involved, the University of Iowa School of Medicine. Eleven courses were given, of which 10 were one to one and one-half day courses having an average and median duration of seven hours. The other was a four-day 26-hour course. All of the courses included open question periods, patient demonstrations, and audiovisual aids as well as lecture and panel discussion. All of the courses except one were designed for both physicians in general practice and in full-time specialty practice. The other was designed solely for physicians in general and part-time specialty practice.

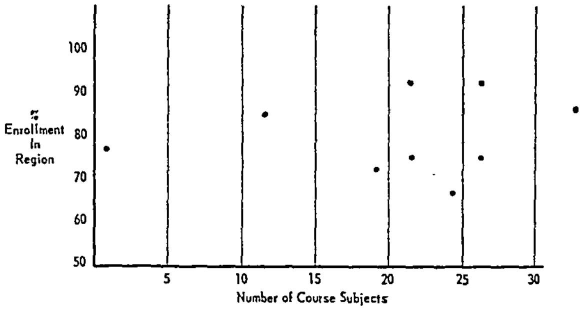

Fig. 4.—Graph showing lack of correlation between number of courses in specific region and enrollments in courses from same region.

Another example showing that the larger travel distances may involve brief rather than lengthy courses is the map (fig. 2) for Buffalo indicating enrollment in the courses offered by the University of Buffalo School of Medicine. Nine continuous courses were reported, each on a different subject area, with one being a one-day 7-hour course, seven being two-day 14-hour courses, and one a six-day 39-hour course. Six of the nine courses included ward rounds in the educational methods, and all used live clinics, patient demonstrations, seminars, open question periods, audiovisual aids, and panel discussions in addition to lectures. The University of Buffalo also scheduled six intermittent courses, three to six hours once a week for 4 to 20 weeks.

Thus, it seems that other factors and probably qualitative ones are more determinative in attracting enrollments from considerable distances than is prolonged duration of the course. This is also reasonable in terms of modern travel times by car, rail, and airplane.

Summary

The geographical origin of 20,432 enrollments in 695 courses given in the year Sept. 1, 1956 to Aug. 31, 1957, was tabulated, mapped, and correlated with geographical location of the courses, subject categories, and kinds of courses. The study comprises 78% of the enrollments and 73% of the courses reported to the Council that year, exclusive of circuit and home-study courses, which were excluded for obvious reasons. In both size of the sampling and characteristics of the courses in the study as compared to all of the courses reported that year, the present study consists of a representative sample from which highly significant conclusions may be drawn.

Physicians' mobility is high in relation to enrollment in postgraduate courses. For the country as a whole, almost one-third of the enrollments came from distances of 50 to 200 miles. Many enrollments were over distances in excess of 300 miles. There is some variation in willingness of physicians to travel that relates to the region from which they originate, with physicians in the eastern seaboard states traveling relatively smaller distances than physicians in the southern, midwestern, and western states. However, in this regard, it appears that the kind of course has greater importance in attracting enrollments from a distance than does the region of the country. It is definitely apparent that in all regions, physicians travel much farther to enroll in postgraduate courses than had previously been assumed. Their actual performance is thus different than is their attitude, as it was reported in the Vollan study.[4]

Medical school courses tend to attract physicians over greater distances than do other courses. There is also a direct relationship between the presence of four-year medical schools in states with the number of courses and course subjects as well as with the enrollments in courses.

There may be in postgraduate medical education a "threshold factor," in terms of number of course subjects in a state or region correlating positively to a high degree with the number of physician enrollments in courses throughout the country. Purely on the basis of such correlation, the threshold of educational stimulus appears to be about four course subjects in a state or region in a year. It is also possible that the correlation per se does not arise from a cause-effect relationship. Certainly the quality of the educational experience is an important factor that must be taken into consideration. Attending only to numbers of course subjects without regard to their educational quality would be a disservice to the profession. It may be that a certain minimum availability of educational experiences of high quality in a region might stimulate physicians to seek other educational activities requiring greater effort, such as travel to a distance.

There is no apparent relationship between the gross characteristics of courses and their likelihood of being canceled because of lack of physician interest. There is a relationship between location and subject categories of canceled courses with the courses given. Conflict of courses in terms of subject and location characterize the courses that were canceled in 1956-1957.

The data and conclusions of this study make apparent the importance of regional and national conceptions in the field of postgraduate courses. It would not be compatible with current reality to confine the planning within each state without regard to the educational opportunities elsewhere in the region and in the nation.

Miss Eileen O'Brien of the Council clerical staff aided in collecting the information secured.

Mr. Charles R. Flowers, Supervisor of the Machine Records Division of the American Medical Association, devised the approach whereby the actual location in each state from which enrollments originated could be punched into the machine cards; he also supervised the extensive machine records services required in this study.

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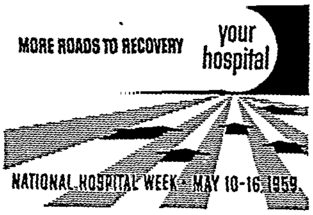

COUNCIL ON MEDICAL SERVICE

FEDERAL MEDICINE AND THE PRIVATE PATIENT

Louis M. Orr, M.D., Orlando, Fla.

My remarks are based on the policy statements of the House of Delegates of the American Medical Association. We look to the Federal Medical Services Committee for implementation of these policies.

Veterans' medical care and the care of military dependents are specific examples of the federal government's participation in the practice of medicine. However, it would be well to consider here the larger picture, the general impact of these programs on American medicine as a whole, and especially on the private patient.

For the physicians and officials of the armed forces and the Veterans Administration, the area of responsibility is limited. Our area of responsibility is the whole nation, the whole American people, and we would fail in that responsibility if we allowed medical programs for one or two groups to expand unchecked at the expense of the rest of the nation.

We must achieve a balance between the medical care available to those persons who are legitimate responsibilities of the government and to the general public, who are our responsibility. Admittedly the veterans and the military comprise a large group, one out of every seven persons in the United States, but even so this group must not be allowed to become the "tail that wags the dog."

Dependent care in military hospitals began as a service to our men in uniform to supplement private medical care. Now private medical care has become officially secondary to that in the Army, the Navy, the Air Force, and Public Health Service hospitals.

The Veterans Administration hospitals, as you all know, were established to care for service-connected disabilities. Now we have reason to fear that this care is becoming subsidiary to a vast program of medical education and research involving an ever-increasing number of veterans with purely civilian disabilities.

The American physician is the last man on earth to oppose good care for our servicemen's wives, their children, and their parents and for our veterans. American medicine has long demonstrated its belief in the power of medical education and medical research to improve this nation's health. But is this the proper instrument to achieve these worthwhile goals? Is it in the best interests of our collective patient, the American people, to build up these federal research and educational and treatment programs at the expense of the civilian nonfederal medical system?

In July, Dr. Roth, chairman of this conference, and chairman of the Committee on Federal Medical Services of the American Medical Association, in testifying before the House Veterans Affairs Committee said: "Let me assure you that if this were a conflict between the best interests of the patient-public and the vested interests of the medical profession, the profession would inevitably yield to the public as it has on every occasion in the past." In other words, "the patient comes first." Even today when the physician is supported by a vast scientific armamentarium, the science of medicine is as much in the service of the patient as was the art of medicine when our diagnostic equipment was slighter. Is this wholly true in federal medicine?

I do not call into question the professional competence of physicians in the federal service. I know from personal experience that high caliber men are treating the patients in these hospitals. But does not the system under which these men work often present obstacles to giving the patient the best care possible?

For instance, the Medicare program was inaugurated to improve our servicemen's morale. Yet today a serviceman's wife who wishes to be with her husband during pregnancy must use the military facilities if it has the appropriate staff and adequate facilities are available. To choose her own obstetrician she must move away from her husband or pay for her own care.

It does not seem that any of these alternatives will help a soldier's morale very much. One of the most important things during pregnancy to the wife is a close physician-patient relationship. It means much to the expectant mother to know that she is going to be treated by her own personal physician, that she can consult him on any problem

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President-elect, American Medical Association.

Read before the Conference on Federal Medical Services at the 12th Clinical Meeting of the American Medical Association, Minneapolis, Dec. 1, 1958.

that arises, that she can call him in the middle of the night in an emergency, real or imaginary, and obtain help.

Can a military hospital staff, by its very nature, provide that sort of personal care? I wonder if the current Medicare regulations do not make it more difficult to provide the best possible care for servicemen's dependents.

Medicare is comparatively new in comparison with the Veterans Administration system. I was chairman of the American Medical Association's Committee on Federal Medical Services before the present policy was established by the House of Delegates in 1953, and I retained that chairmanship until last June. I believe this partially qualifies me to speak as an "old hand" on the problems of veterans' medical care.

The Veterans Administration system as it presently exsists reminds me forcibly of the old adage, "You can't get something for nothing." We all know that—but Americans are incurable optimists and keep hoping that some day one of the big free offers will really come true. We go on collecting trading stamps, even though we know that the cost of the premium is added to the bill.

But does the veteran know what he pays for when he gets his "free" medical care? The man who is treated for service-connected illness or injury knows —and he has already given to this nation more than we can every repay. But how about the veteran who goes into a Veterans Administration facility for treatment of a civilian disability? Does he really think this care is as free as it seems to be?

Of course, he does not have to pay cash directly to the hospital or to the physicians who treat him, as he would in a private hospital—but he pays in other ways. He pays in time by staying in the hospital, away from home, job, friends, and family, a month longer on the average that he would in a private hospital. He pays in taxes for the constantly increasing cost of the Veterans Administration hospital system—more than 715 million dollars for hospital inpatient care alone this current year, not counting outpatient care and research and administrative expenses.

Here are a few choice figures from the midyear review of the 1959 federal budget:

Expenditures for compensation and pensions for veterans are expected to be 134 million dollars higher than in 1958, a total of $3,233,000,000.

The cost of veterans' medical care and hospital construction and modernization is expected to be 93 million dollars higher—a total cost of 911 million dollars, or almost a billion dollars.

More than half of the budget receipts of the federal government will be from individual income taxes. Twenty-two million veterans and their families comprise a sizable slice of the tax-paying population.

This is free care? Everyone here will contribute his share to the 36 billion dollars the Bureau of the Budget expects to collect from the income tax this year, and I think all of us have a legitimate reason to be concerned about where our money goes.

I think we may be especially concerned when even Representative Olin Teague, chairman of the House Veterans Affairs Committee, says, and I am quoting from the official record of the committee hearings of last July:

"In my opinion, when dollars are collected from taxpayers and come to Washington, and we return them to the local communities and States, they have shrunk in value, in almost every instance. I believe Dr. Stacy (of the Oklahoma County Medical Society) is right in saying that, in fact, most of the truly indigent veterans who have non-service-connected illnesses can be taken care of in existing State and private facilities without expense to the Federal government."

As a taxpayer, those words are of great concern to me. I do not see how they justify anything but a return of responsibility for veterans' indigent care to the state and the local communities—despite Congressman Teague's explanation that, as long as the federal hospitals are there, we should use them. That is the argument that started non-service-connected care more than 30 years ago when we had only 9,500 "extra" beds. Now we have more than 80,000 so-called extra beds. As a taxpayer I want to know where this is going to stop!

But I am not talking just as a taxpayer or as a veteran. I am talking as a physician, and about the effect of these programs on my chosen profession. Despite the vastness of the programs and the bills that are running up, I believe that the effect of these plans on American medicine is an even more urgent matter.

I have mentioned the loss in personal relationship between patient and physician in Medicare, which is, I am sorry to say, quite characteristic of most federal medicine. I have also said how and what the veteran is going to pay for his so-called free care, not just in taxes but in the time lost away from his family and from his job.

This loss of choice and these hidden payments would be enough reason for me to advise an individual patient to go to his own physician and his own hospital; in some cases I believe that Veterans Administration patients might even avoid hospitalization altogether through private care. But this is, after all, still a matter for individual decision. Under present laws, the patient can determine whether he should accept the government care, if a serviceman's dependent or a veteran "unable to pay."

But the community's loss from federal medicine is a matter which must directly concern all physicians. Congressman Teague has said tax dollars shrink when they go to Washington. We most certainly agree. They shrink in a number of ways, and one is that they buy a great deal less hospital care.

Comparing average lengths of stay, a bed in a nonfederal hospital can take care of five times as many patients as one in a Veterans Administration hospital. Comparing costs per case, a Veterans Administration hospital case costs about three times as much as a nonfederal hospital case.

These figures are taken from a detailed analysis of Veterans Administration hospital expenditures published this spring by the Committee on Federal Medical Services, their source being the Veterans Administration's own statistics. They make it difficult to understand how anyone can seriously urge continued Veterans Administration expansion especially while there are still areas in our nation inadequately supplied with hospital beds for the general population.

I cannot quote you similar figures for military hospitals, since the committee has not been able to find a breakdown of their operating costs which would allow a really accurate cost comparison with nonfederal institutions. However, it is obvious that these shrunken tax funds could be used more sensibly and profitably—in their unshrunken form—to provide more local health facilities for the entire population.

It is not just the waste of money or the competition for the tax dollar which is disturbing. We are also very seriously concerned about the competition for staff personnel. You have already heard this morning some discussion of the disproportionate share of internships and residencies in federal hospitals. This can have a number of interlocking results, all disturbing to the private physician. It can lead, and to a certain extent has already led, to a demand for greater variety in the federal case load, meaning more non-service-connected cases in the Veterans Administration and more dependents in the military hospitals. It can lead to greater federal control of our medical schools, not through a purposeful campaign but by default, as the private teaching hospitals drop internships and residencies, because of an inability to compete with the inducements offered by the government with our tax dollars. It can lead to a large group of physicians in this country whose total hospital experience during the educational process, from clinical clerkship to completion of residency training, has been under federal control.

These men will have little or no understanding of the private practice relationship between the individual physician and the individual patient, because their entire career will have been as salaried employees of the federal government.

It is not good for such a large segment of the American medical profession to be diverted from what has been in the past the main current of American medicine. It certainly is not good for those private hospitals which are unable to compete for interns and residents because they must meet their costs from income rather than from congressional appropriations. Some will be forced to reduce the services they can offer their patients. Some will be forced to employ full-time staff to replace the interns and residents they cannot obtain, with a consequent increase in the hospital bill. That bill is further raised because the federal government pays more than the prevailing wage for nurses in almost every section of the country.

As a result, the patient finds his hospital costs going up and his taxes going up, and fails to realize that the way in which those taxes are being spent is one of the very factors that pushes his bill higher. This would be almost ludicrous if it were not so nearly tragic in its possible consequences for our American medical system.

This question of hospital costs can be very irritating for a physician, since it is common practice to blame the medical profession for any increase in the cost of medical care, whether it comes in the form of hospital rates, prescription costs, or even insurance premiums. But I am even more concerned when this artificial forced increase and this artificial scarcity of professional personnel for nonfederal hospitals makes adequate hospital care more difficult for the civilian population to obtain.

John Donne's phrase about no man being an island "entire of itself" has possibly become overfamiliar in recent years, but like many familiar phrases, it is used so frequently because it is so true. It applies equally well in this area.

There is a definite interrelation between private and federal medicine. The legislators and administrators cannot make federal medicine an island, having no effect on medical practice in the rest of the United States.

We want the best possible federal medical program for those who are legitimate federal responsibilities—our servicemen, the veterans who suffered actual war damage, the American Indians who are still federal wards—but we must not allow the whole private practice of medicine to be vitiated by a vast overemphasis on military and veterans' hospitals.

It has been a pleasure to have this opportunity of telling you the reasons why these trends disturb me. I sincerely hope this conference will be a step toward the proper integration of federal medicine in the total American medical picture.

MEDICAL NEWS

ALABAMA

State Medical Education.—At the 98th annual session of The Medical Association of the State of Alabama the following officers were installed: president, Dr. William R. Carter, Repton; president-elect, Dr. Hugh E. Gray, Anniston; vice-president, Southeastern Division, Dr. James A. Brantley, Troy; state board of censors for five-year terms, Dr. Wilmot S. Littlejohn, Birmingham, succeeded himself and Dr. Grady O. Segrest, Mobile, succeeded himself.

CALIFORNIA

Annual Symposium in Long Beach.—The second annual symposium to be held in conjunction with the formal opening of the new 400-bed Memorial Hospital of Long Beach will have the theme "New Horizons in Medicine" and will be held Dec. 2 in the new hospital. For information, write Dr. George X. Trimble, Director of Medical Education, Seaside Memorial Hospital, 1401 Chestnut Ave., Long Beach 13, Calif.

Personal.—Dr. Andrew D. Hunt Jr., of Flemington, N. J., will head the outpatient clinics of the now-building, 22-million-dollar Palo Alto–Stanford Hospital Center. He will be director of ambulant services as well as associate professor of pediatrics at Stanford Medical School. Both appointments are effective April 1.——Dr. John H. Lawrence, professor and director of the Donner Laboratory of Medical Physics, University of California, Berkeley, was the guest of the Japanese Medical Congress in Tokyo during the first two weeks of April, where he gave two papers.

ILLINOIS

State Surgical Meeting.—The Illinois Surgical Society will conduct its annual clinical and scientific meeting in Chicago, May 18, at Cook County Hospital and the University Club. Dr. William Johnson, president of the society, is chairman of the surgical symposium. A total of 23 surgical clinics are planned. The evening of May 18, Dr. Willis J. Potts, Chicago, will present "Respiratory Emergencies and Complications in Pediatric Surgery." The Iowa Academy of Surgery will be guests at this meeting. Members of the medical profession are invited to all sessions. For information write the Illinois Surgical Society, Inc., Suite 1421, 122 S. Michigan Ave., Chicago 3.

Annual Meeting in Chicago.—The Illinois State Medical Society will hold its 119th annual meeting in the Hotel Sherman, Chicago, May 18-22. Scientific programs, presented on May 19-22, will consist of general assemblies, panels, and sectional meetings covering allergy, anesthesiology, cardiovascular disease, dermatology, EENT, medicine, obstetrics and gynecology, pathology, pediatrics, preventive medicine and public health, radiology, and surgery. The invited out-of-state speakers and their subjects will be:

Current Concepts on Anesthesia in the Aged, Dr. Henry K. Beecher, Boston.
Roentgen Diagnosis of Benign Gastric Ulcer, Dr. Harold O. Peterson, Minneapolis.
Some Comments on Treatment of Congestive Heart Failure, Dr. Robert O. Brandenberg, Rochester, Minn.
Indications for Surgery in the Middle Ear Deafness, Dr. Bruce Proctor, Detroit.
Sodium, Hypertension, and Primary Aldosteronism (Oration in Medicine), Dr. Jerome W. Conn, Ann Arbor, Mich.
Changing Concepts in the Use of Antibiotics in the Treatment of Surgical Infections (Oration in Surgery), Dr. Frank L. Meleney, Miami.
A Review of the 1958 Poliomyelitis Epidemic in Detroit, Dr. Joseph G. Molner, Detroit.
Vascular Complications in Pregnancy, Dr. Eugene A. Osius, Detroit.
Problems in Learning from Clinical Experiences, Dr. Eugene A. Stead, Durham, N. C.
A Critical Reevaluation of Nutritional Requirements in Growth and Development, Dr. Charles U. Lowe, Buffalo.
Recent Developments in the Etiology of Bronchial Asthma, Dr. Samuel C. Bukantz, Denver.
Cellular Diagnosis of Adenocarcinoma of the Female Genital Tract, Dr. James W. Reagan, Cleveland.
Systemic Therapy of Superficial Fungus Infections, Dr. Harvey Blank, Miami.

Dr. Raleigh C. Oldfield, of Oak Park, will give his presidential address at the Wednesday general assembly. The annual banquet will be hold on that night. For information, write Dr. Harold M. Camp, Secretary, Illinois State Medical Society, Monmouth, Ill.

Chicago

Dermatological Lecture.—The ninth Arthur William Stillians Lecture of the Metropolitan Dermatological Society of Chicago will be given at its annual meeting, May 13, by Dr. Milton E. Kurth, staff, Cook County Hospital and the University of Illinois, on plastic surgery in dermatology.

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education, and public health. Programs should be received at least three weeks before the date of meeting.

Annual Lecture.—The annual D. J. Davis Memorial Lecture on Medical History was given April 22 by Dr. Lloyd G. Stevenson, professor of the history of medicine, and dean of the Faculty of Medicine, McGill University, Montreal, P. Q., Canada, on "The Early Development of Internal Medicine in the United States."

Research Institute Elects Board Members.—At the annual meeting of the board of directors of the Hektoen Institute for Medical Research of Cook County Hospital March 26 the following were elected as members of the board: Mr. Arthur S. Bowes, Dr. Lowell T. Coggeshall, and Commissioner John J. Duffy.

Dr. Rostenberg Named Department Head.—Dr. Adolph Rostenberg Jr., professor and acting head of the department of dermatology, University of Illinois College of Medicine, was appointed professor and head of the department on April 14 by the board of trustees. The appointment, effective May 1, fills the vacancy created last September by the resignation of Dr. Marcus R. Caro. Dr. Rostenberg has been on the staff of the university since 1945, when he was appointed professor of dermatology.

Symposium on Steroid Therapy.—The Chicago Medical School will sponsor a symposium on Steroid Therapy to be held at the Drake Hotel, Chicago, May 15-16, with Dr. Edward F. Rosenberg as general chairman. Dr. John J. Sheinin, president, Chicago Medical School, will open the meeting with an address. Eleven papers are scheduled to be presented, and the program will conclude with a panel discussion on "Steroid Therapy in Medicine." There is no registration fee. For information, write Dr. Rosenberg at 109 N. Wabash Ave., Chicago 2.

MARYLAND

Resolution on Tetanus Immunization.—At a recent meeting, the Baltimore City Medical Society passed a resolution dealing with mass tetanus toxoid immunization, reading, in part, as follows:

> Whereas, there has been an increase in all age groups in the incidence of trauma and . . . the major portion of our population has not been actively immunized against tetanus, even though such protection has been afforded to all former armed service personnel and most children since 1940, and
>
> Whereas, the rate of temporary disability due to reactions to TETANUS ANTITOXIN administration is high despite all precautions, and permanent disability and even death do occur following the use of TETANUS ANTITOXIN, and
>
> Whereas, in . . . a sudden emergency . . . it would be well nigh impossible to adequately test large numbers of casualties for sensitivity to foreign protein, and
>
> Whereas, the above-mentioned complications . . . constitute a public health problem in this State, even though the incidence of tetanus as a disease is low; therefore be it
>
> Resolved, that the Baltimore City Medical Society go on record as favoring the accomplishment of universal, active immunization of the population, preferably by the administration of toxoid by the family physician, and further be it
>
> Resolved, that the Baltimore City Medical Society request the Baltimore City Health Department to help publicize the importance of this problem and to undertake the active immunization of the indigent, who are now cared for under the Medical Care program . . .

MASSACHUSETTS

Dr. Schall Honored.—Dr. LeRoy A. Schall, retiring Walter Augustus Le Compte Professor of Otology and professor of laryngology at Harvard Medical School, Boston, was the presiding officer at a two-day scientific session held recently in his honor by the Massachusetts Eye and Ear Infirmary, an affiliated part of the Massachusetts General Hospital. Dr. Schall had designated a number of his "outstanding students" at Harvard from the past 25 years to participate in the program. Out-of-town speakers included Dr. Julio Quevedo from Guatemala; Dr. John J. Shea from Memphis, Tenn.; Dr. Clair M. Kos, University of Iowa; Dr. Richard Thomas Barton, Los Angeles; Dr. J. H. Thomas Rambo, of New York City; and Dr. Norman Jesberg, Los Angeles.

Laboratory to Study Hearing Physiology.—A laboratory for studing the physiology of hearing has been established by the Massachusetts Eye and Ear Infirmary and the Massachusetts Institute of Technology, Boston. Doctors, neurophysiologists, and electrical engineers will work together in a program of research, treatment, and education. The new laboratory, which is sound-proof and vibration-proof, was built and equipped at a cost of $200,000 and will be operated under grants from the National Institutes of Health. Located at the infirmary, it is known as the Eaton–Peabody Laboratory of Auditory Physiology. Work in the laboratory is under the direction of Dr. LeRoy A. Schall, chief of otolaryngology for the infirmary and Le Compte Professor of Otology at the Harvard Medical School, and Walter A. Rosenblith, professor of communications biophysics at M. I. T. The research is under the direct supervision of Dr. John W. Irwin, director of the Microcirculatory Laboratory at the infirmary, and Nelson Yuan Sheng Kiang, neurophysiologist at M. I. T.'s Research Laboratory of Electronics.

MICHIGAN

Wayne Alumni Reunion.—Date of the 91st alumni reunion and clinic day for 2,500 graduates of Wayne State University College of Medicine, Detroit, has been set for Wednesday, May 13, according to Dr. Theodore I. Bergman, '32, president of the association. The one-day scientific meeting, climaxed by a reception and dinner dance, will be held at the Fort Shelby Hotel in Detroit.

Plan Mental Health Projects.—In recognition of the World Mental Health Day, April 7, the department of psychiatry, Wayne State University College of Medicine, Detroit, designated special research and development projects to be advanced in 1960 (World Mental Health Year) in harmony with the resolution of the World Federation Organization of Mental Health, a United Nations Agency. Dr. John M. Dorsey, chairman of the department, named the following projects selected by the staff for special emphasis: (1) the problem of child care and the psychological aspects of education as well as the psychiatric education of medical students; (2) the mental health of the college student; (3) problems of convalescence, vocational rehabilitation, and the psychological aspects of industrial medicine; (4) problems of migration and the migratory worker; (5) problems of addiction, including alcoholism and the industrial aspects of it; and (6) problems of depression and suicide, with special reference to the rescue fantasy.

NEW JERSEY

Spring Symposium on Diabetes.—The New Jersey Diabetes Association in cooperation with the New Jersey State Department of Health will present a spring symposium on "Neurovascular Complications of Diabetes Mellitus" at St. Peter's General Hospital, New Brunswick, May 13. The following papers are scheduled:

Trophic and Ulcerative Lesions of the Lower Extremities in Diabetes, Dr. Norman Rosenberg, New Brunswick.

Diabetic Triopathy-Retinopathy, Nephropathy and Neuropathy, Dr. Robert F. Bradley, Boston.

Diabetic Neuropathy Involving the Autonomic and Parasympathetic Nervous Systems, Dr. Charles Shuman, Philadelphia.

Central Nervous System Complications of Diabetes Mellitus, Dr. Sherman Gilpin, Philadelphia.

A panel discussion moderated by Dr. William Levison will conclude the meeting. For information, write Dr. Arthur Krosnick, State of New Jersey Department of Health, Trenton 7, N. J.

NEW YORK

Dr. Thomas to Come to Albany.—Dr. Wilbur A. Thomas, associate professor of pathology, Washington University School of Medicine, St. Louis, has been named professor of pathology and chairman of the department at Albany Medical College and pathologist-in-chief at Albany Hospital, effective July 1. He will succeed Dr. Arthur W. Wright, department chairman for 25 years. Dr. Wright, who reaches the administrative retirement age this year, will continue as professor of pathology. Dr. Thomas was named instructor in pathology at Washington University in 1953, was elected a diplomate of the American Board of Pathology in the following year, and became associate professor in 1957. From September, 1957, to March last year, Dr. Thomas served as visiting professor and acting head of the department of pathology at the University of Baghdad, under a Fulbright fellowship.

Annual Convention in Buffalo.—The 153rd annual convention of the Medical Society of the State of New York will be held May 9-15 at the Hotel Statler-Hilton, Buffalo. Section meetings will be held during the mornings with general sessions in the afternoons, including the following symposiums and panel discussions:

Hypnosis in Clinical Practice, moderated by Dr. Hyman S. Barahal, West Brentwood.

Management of Patients Requiring Operation, Dr. Irving Pallin, Brooklyn.

Advances in Pulmonary Diagnosis and Treatment, Dr. Arthur Q. Penta, Schenectady.

Surgery in Cardiovascular Disease: Indications and Results, Dr. Francis W. O'Donnell, Buffalo.

Present Status of Oral Hypoglycemic Agents, Dr. Grosvenor W. Bissell, Buffalo.

Prognosis in Surgically Treated Cancer, Dr. Harry W. Hale Jr., Buffalo.

Control of Infectious Hazards in Home and Hospital, Dr. Morris Greenberg, New York.

Role of the General Hospital in the Care of Special Medical Problems, Dr. William A. Kelly, Mount Vernon.

The A. Walter Suiter Lecture, "Recent Progress in Our Understanding of Bilirubin Metabolism and Jaundice," will be given by Dr. Irwin M. Arias, Bronx. The history of medicine section will hold a symposium open to the public on "History of Microscopy—1590 to the Present" the morning of May 15. Speaker at the May 11 reception will be Dr. Gunnar Gundersen, LaCrosse, Wis., President, American Medical Association. Exhibits and films are planned. For information write the Medical Society of the State of New York, 750 Third Avenue, New York 17.

New York City

South African Visitor.—Dr. John Fleming Block, Cape Town, a former Rhodes Scholar and medical research fellow at Harvard, presented a lecture on "Human Nutrition and its Growing Importance to Clinical and Investigational Medicine" at the Cornell Medical College, April 15, as part of the Squibb Centennial Lecture series.

Lay Teachers Take Orthopedic Training.—Forty-five New York City school teachers are "going to school" at the Hospital for Joint Diseases, 123rd Street and Madison Avenue, to learn how to detect bone and joint ailments among their pupils and how to handle handicapped youngsters in their classrooms. The course, on the graduate level, began Feb. 17 and ends June 2. It consists of a series of 15 hour-and-40-minute lectures, discussions, and film showings by physicians, social workers, rehabilitation counselors, school guidance counselors, visiting nurses, and educators. These are held every Tuesday at 3:45 p. m. at the hospital. Ailments to which children in the growth years are subject are demonstrated to the teachers by physicians on the hospital's staff. The course is sponsored jointly by the Board of Education's Bureau for the Education of the Physically Handicapped, Play Schools Association, and the Visiting Nurse Service. The purpose of the course is to facilitate the early detection of orthopedic ailments. It is being directed and coordinated by Dr. Barnard Kleiger, attending orthopedic surgeon at the Hospital for Joint Diseases.

OHIO

History of Medicine Meeting.—The Cleveland meeting of the American Association of the History of Medicine will be held May 21-23 and will deal with aspects of medical history, from vaccination to surgical pathology in the Renaissance. On May 22 a "Symposium on the Heart" will include Drs. Carl J. Wiggers, Victor A. McKusick, Harold Feil, and George H. A. Clowes, Jr. A round-table discussion commemorating the centennial of Charles Darwin's "Origin of Species" will be held May 23. The annual dinner will take place the evening of May 22. All meetings will be held at the Cleveland Medical Library, and interested persons are invited. Local Chairman is Dr. Bruno Gebhard, Cleveland Health Museum, 8911 Euclid Ave., Cleveland 6.

OREGON

Cancer Conference in Portland.—An Oregon Cancer Conference will be held July 16-17 in Portland under the joint sponsorship of the Oregon State Medical Society, the Oregon Division of the American Cancer Society, and the University of Oregon Medical School. The conference is planned as a special feature of the Oregon Centennial celebration. The guest speakers will include Dr. Arthur C. Allen, professor of pathology, and Dr. Ralph Jones Jr., professor of medicine, University of Miami School of Medicine, Coral Gables, Fla.; Dr. Gilbert H. Fletcher, Houston, Texas, radiologist, Tumor Institute of the M.D. Anderson Hospital; Dr. Leslie M. Smith, dermatologist, El Paso, Texas; Dr. Francis Bayard Carter, professor of obstetrics and gynecology, Duke University School of Medicine; Dr. Gilbert Dalldorf, Albany, N. Y., director, Medical and Scientific Research Department, National Foundation; and Dr. John E. Dunphy, Portland, professor of surgery, University of Oregon Medical School. Each guest speaker will participate in one or more panel discussions. The program is being developed under the direction of the Committee on Cancer, Oregon State Medical Society, with Dr. Martin A. Howard, Portland, chairman. All sessions will be held in the library auditorium at the University of Oregon Medical School. The banquet the evening of July 16 will be held at the Hotel Multnomah. For information and reservation forms, write Mr. Roscoe K. Miller, Executive Secretary, Oregon State Medical Society, 1115 S. W. Taylor St., Portland 5, Ore.

PENNSYLVANIA

Ophthalmology-Otolaryngology Meeting.—Governor David L. Lawrence of Pennsylvania will be the honor guest at the annual meeting of the Pennsylvania Academy of Ophthalmology and Otolaryngology at the Bedford Springs Hotel, Bedford, May 21-23, with Dr. Murray F. McCaslin, Pittsburgh, presiding. Sixteen speakers will hold scientific sessions and instructional courses in ophthalmology and twenty-four speakers will participate in scientific discussions and study clubs concerning problems and progress in otolaryngology. On Thursday, May 21, a special highlight of the meeting will be a symposium on medical economics. Following this, the otolaryngologists will discuss the otologist and the dispensing of hearing aids. Members of the Medical Society of the State of Pennsylvania and their wives are cordially invited. For information, write Dr. Benjamin F. Souders, 424 Walnut St., Reading, Pa.

RHODE ISLAND

Annual Meeting in Providence.—The Rhode Island Medical Society will hold its annual meeting May 12-13 in Providence. The Chapin Oration will be given by Dr. John R. Paul, New Haven, Conn., on "Chapin and Modern Epidemiology." The program includes the following papers:

The Value and Limitations of Liver Function Tests, Dr. Franklin M. Hanger, New York City.

The Rhode Island Women's State Cytology Program: Progress Report, Dr. Yo Seup Song, Providence.

Medical Aspects of Iatrogenic Disease, Dr. Anthony P. Caputi, Newport.

Viral Infections of the Respiratory Tract, Dr. Harry M. Rose, New York City.

Indications and Results of Inferior Vena Caval Ligation in the Treatment of Thromboembolic Disease, Dr. John B. Blalock, New Orleans.

Visual Problems in Roentgen Diagnosis, Dr. William J. Tuddenham, Philadelphia.

Bronchogenic Carcinoma: Predisposing Causes, Dr. Alton Ochsner, New Orleans.

A panel discussion on "Deafness" is planned for the morning of May 13. Dr. Francis B. Sargent will present the presidential address on "Our Allies, the Hospitals and Blue Plans; Assets or Liabilities?" The meeting will conclude with a dinner at which Dr. F. J. L. Blasingame, Executive Vice-President, A. M. A., will present "Reorganization of the American Medical Association." For information write the Rhode Island Medical Society, 106 Francis St., Providence 3.

TENNESSEE

Dr. Rogers Receives Pathology Award.—"For basic research on how tumors and cancers behave and grow," Dr. Stanfield Rogers, director of Memorial Research Center of the University of Tennessee, Knoxville, received the third annual award of the American Society for Experimental Pathology, April 15. The award, and a $1,000 honorarium contributed by Parke, Davis & Company, honors original research by pathologists under 40 years old. Dr. Rogers' experiments began in 1947 at the Rockefeller Institute for Medical Research, New York City, and were continued at Duke University, Durham, N. C.

UTAH

Surgical Meeting in Ogden.—On May 20-22, the Ogden Surgical Society will hold a meeting under the presidency of Dr. Noall Z. Tanner. The program includes a panel discussion on "Pancreatitis" and meetings of specialty groups. The following are listed as participants:

Drs. John H. Mulholland and Mather Cleveland, New York City; George S. Sharp, Pasadena, Calif.; Hamish W. McIntosh, Vancouver, B. C.; Rodney H. Maingot, London, England; Everett G. Grantham, Louisville, Ky.; Donald W. deCarle, San Francisco; James T. Priestley, Rochester, Minn.; J. Hartwell Harrison, Boston; Stewart G. Wolf, Oklahoma City; Clifford G. Grulee, Evanston, Ill.; Nathan J. Smith, Daniel G. Morton, and Howard P. House, Los Angeles; R. Adams Cowley, Baltimore; and Alton Ochsner, New Orleans.

Luncheon discussions and a ladies' luncheon are planned. For information write Dr. L. D. Nelson, Washington Terrace, Ogden, Utah.

VIRGINIA

David C. Wilson Lecture.—On May 14, Dr. William Malamud, president, American Psychiatric Association, and research director of the National Association for Mental Health, will present the first David C. Wilson Lecture in Psychiatry at the University of Virginia School of Medicine, Charlottesville. This is the first of a series of lectures established at the university in honor of Dr. Wilson, who was chairman of the department of neurology and psychiatry for 26 years and has been professor of neurology and psychiatry for 30 years. Upon his retirement as chairman in 1956, the David C. Wilson Society was established, and this lecture is sponsored by the society with assistance of a grant from the Mona Bronfman Sheckman Foundation.

Roanoke Hospital Wins Safety Award.—Roanoke Memorial Hospital, Roanoke, was announced as the "grand award winner" of the 1958 Hospital Safety Contest, co-sponsored by the American Hospital Association and the National Safety Council. The contest was judged on the basis of the lowest number of injuries among employees of individual hospitals in relation to the number of man-hours worked during the year-long contest. The 280 hospitals which completed the contest reported a total of 367,075,000 man-hours worked during 1958, with a total of 3,042 injuries incurred resulting in at least one day lost from work. The contest is designed to encourage the observance of safety practices among hospital employees. Roanoke Memorial Hospital, with 530 employees, operated 1,168,346 man-hours last year without a reportable injury to win the grand award.

WASHINGTON

Allergy Meeting in Richland.—The Washington State Allergy Society will hold its spring meeting May 16 at the Desert Inn Hotel, Richland. The following papers are scheduled:

Pollens of the Northwest and Their Control, Dr. James E. Stroh, Seattle, and Ted W. Galbraith, B.S., Pasco.
Meteorology and Aero-Allergens, Glenn R. Hilst, Ph.D., Richland.
The Removal of Aero-Allergens, Don Wisehart, B.S., Richland.
Atmospheric Physics and Factors Which Influence Allergic Individuals, Dr. Konrad J. K. Buettner, Seattle.
Air Ion Density and Its Relation to Allergic Conditions, Dr. A. G. Corrado, Richland, and J. C. Beckett, San Francisco, Calif.
Industrial Allergy, Dr. Sherman M. Williamson, Seattle.

At the noon luncheon Mr. Daggett W. Norwood, of Richland, will present "Miracle of the Atom." A business meeting will conclude the formal program. Dr. Stroh is president of the society and Dr. Herbert L. Cahn, Richland, is the secretary.

Cancer Symposium on Spokane.—On May 25-26 a Cancer Symposium will be held at the Davenport Hotel, Spokane, sponsored by the Spokane County Unit, American Cancer Society. The program will open with an address by Dr. Clarence Lyon, president, Spokane County Medical Society, followed by an address by Dr. Alton Ochsner, New Orleans, on "New and Practical Approaches to Chemotherapy of Cancer." Four panel discussions are planned with the following moderators:

How to Treat Primary Cancer of the Breast, Dr. G. Edward Schnug, Spokane.
The Spread of Cancer During Surgery and Chemotherapy in Cancer, Dr. John Sonneland, Spokane.
Recent Changes in Diagnosis and Treatment of Lung Cancer, Dr. Waverly Ellsworth, Spokane.
Colonic Polyps, Cancer and Treatment, Dr. Carl Schlicke, Spokane.

Two films are planned and breakfast, dinner, and luncheon programs are arranged. Participants include the following: Drs. Warren Cole, Chicago; L. Henry Garland, San Francisco; George Moore, Buffalo; W. Bradford Patterson, Boston; Jerome Urban, New York City; and David Wood, San Francisco. For information write Dr. John Sonneland, Doctors' Building, 104 W. Fifth Ave., Spokane 4, Washington, General Chairman.

GENERAL

Information Exchange for Ophthalmologic Research.—The National Committee for Research in Ophthalmology and Blindness, 406-C South Boulevard, Evanston, Ill., established a confidential information exchange for groups seeking scientists, physicians, or technical personnel interested in research in ophthalmology and blindness. Institutions or individuals interested may secure information from the committee office.

Certification in Child Psychiatry.—The American Board of Psychiatry and Neurology, Inc., announced that it is undertaking subspecialty certification in child psychiatry for those child psychiatrists meeting the required standards. Information may be obtained by writing Dr. David A. Boyd Jr., Secretary-Treasurer, American Board of Psychiatry and Neurology, Inc., 102-110 Second Ave., S. W., Rochester, Minn.

Grants for Blood Research.—The Hematology Research Foundation invites applications for grants-in-aid for hematologic research for a period of one year. Applications must be submitted no later than June 25 to Hematology Research Foundation, 64 W. Randolph St., Chicago 1. Nine copies of application are requested (application forms are available upon request). Awards will be announced by the medical advisory board, which will choose the applicants on the basis of the proposed research project.

Health Council Membership Increases.—The executive committee of the National Health Council reestablished the membership of the American Hospital Association in the council. The action followed a meeting of the board of trustees of the American Hospital Association in Chicago, when it was voted to have the association reaffiliate with the council. The move brought to 65 the membership of the council, which was established in 1921, and is composed of national organizations concerned with health improvement. Other recent additions to the membership of the council include the American Medical Association, and the American College of Preventive Medicine.

Request for Civil War Data.—Dr. Morgan B. Raiford, Ponce de Leon Infirmary, 679 Juniper St., N. E., Atlanta 8, Ga., announced that "1961 will be the centennial year of the formation of the medical services, both of the Confederate and Union Forces. The Atlanta Historical Society and the Civil War Round Table have been given funds to establish an exhibit on medical services of the Confederate Armies for the centennial period [and] to collect as much informative data regarding this era of medicine as possible . . ." Anyone having information, items of interest, or photographs (to lend) of interesting correspondence and medical equipment should write to Dr. Raiford at the above address.

Catholic Hospital Convention in St. Louis.—The 44th annual convention of the Catholic Hospital Association of the U. S. and Canada will be held at Kiel Auditorium, St. Louis, June 1-4, with "Management: A Sacred Trust" as the theme. Preconvention meetings will be held May 30-31. Speakers from the health and hospital fields and industry will be featured during the convention. Rev. John J. Flanagan, S.J., executive director of the association, said the entire program has been designed for all hospital personnel who have supervisory responsibilities. "It will develop basic general principles of management applicable to all departments in the hospital," he said. For information, write the Catholic Hospital Association, 1438 S. Grand Blvd., St. Louis 4.

New Journal on Research of Lipids.—The first issue of the *Journal of Lipid Research* will be that of September, 1959. Donald B. Zilversmit, Ph.D., is editor, and Drs. Joseph H. Bragdon and Jules Hirsch are associate editors. Corresponding editors include specialists from Canada, Sweden, France, Germany, England, Belgium, Israel, and Japan. The journal, a quarterly, will publish original articles dealing with the chemistry, biochemistry, enzymology, histochemistry, and physiology of the lipids and will contain review articles and a listing of new lipid methods published in other journals. Copies of "Instructions to Authors" may be obtained by writing to the editor at the Editorial Office, University of Tennessee, Memphis, Tenn. Subscription price is $6 per year.

Report on Longevity.—Average length of life of America's wage earners increased slightly in 1958 after showing a small decrease the preceding year, statisticians of the Metropolitan Life Insurance Company report. According to provisional mortality figures for 1958, the average length of life (expectation of life at birth) for the Metropolitan's millions of industrial policyholders was 70.2 years, an increase of 0.2 years over the figure for 1957. The average length of life of these insured persons has increased three years in the past decade, and more than eight years since 1938. "In 1909, the expectation of life at birth among the insured persons was about six years less than that for the population as a whole; at present the two are on a par," the statisticians note.

Surgeons Form Trauma Section.—The United States Section, International College of Surgeons, has formed the Section on Surgery of Trauma as a successor to the Section on Occupational Surgery. Dr. Chester C. Guy, clinical associate professor of surgery at the University of Illinois College of

Medicine, Chicago, is chairman of the section and Dr. N. Gillmor Long, Evanston, is co-chairman and secretary. The Section on Surgery of Trauma will provide a forum for those surgeons whose work is limited to traumatic lesions and for those who treat lesions frequently in their daily practice. The section "will deal with developments in the treatments of specific injuries, consider programs for the prevention of injuries, conduct studies on basic physiologic and pathologic changes in the injured person, and give thought to allied subjects."

Institute to Study Gravitational Strain.—The Institute for Gravitational Strain Pathology, Inc., a new research institute, studies the specific and general ill effects of gravitation on man. The institute represents a scientific, educational, nonprofit organization, incorporated in the State of New York, and is supported by philanthropic funds. Clinical experimentation is carried out by means of a special tool ("antigravitation leverage technique") designed to modify the pathogenic thrust of gravity on the living human being. Involved are the pathology of man's upright posture, human energetics, the processes of stress and strain, and of chronic fatigue. The present topic of the investigations is the "low-back problem." Reports on the institute's work will be published. For information write Dr. Martin Jungmann, Director, Institute for Gravitational Strain Pathology, 1384 Third Ave., New York 21.

Grants for Treatment and Research.—The National Foundation has announced treatment and research grants amounting to almost one million dollars in March of Dimes funds and including studies related to the problems of arthritis and birth defects. The National Foundation has expanded its program beyond polio to include viruses in general, disorders of the central nervous system, arthritis, and birth defects. Nine of the awards announced are for support of polio rehabilitation centers, part of a country-wide network of 15 March of Dimes-sponsored centers devoted to treatment of the aftereffects of polio. One grant was made in support of work at the Edward Daniels Faulkner Arthritis Clinic of the Presbyterian Hospital, New York City. The newly announced grants bring 1959 authorizations to a total of $4,030,045 in March of Dimes funds.

Prizes for Unpublished Monographs.—The American Academy of Arts and Sciences announced three prizes of $1,000 each to be awarded annually to the authors of "especially meritorious unpublished monographs" one each in the humanities, social sciences, and physical and biological sciences. A monograph is defined for the purposes of these awards as a "scholarly contribution to knowledge, too long for an article in a learned journal and too specialized or too short for a general book. Recipients of these prizes will be expected to make their own arrangements for publication. The final date in 1959 for receipt of manuscripts by the committee on awards is Oct. 1. Announcement of the awards will be made in December. Details may be secured on request from the Committee on Monograph Prizes, American Academy of Arts and Sciences, 280 Newton St., Brookline Station, Boston 46.

Committee on Research for National Foundation.—Fourteen U. S. scientists have been named to guide the expanded medical and scientific research program of The National Foundation as it begins its work on arthritis, birth defects, central nervous system disorders, and virus diseases in general. Headed by the president of the University of Southern California, Dr. Norman H. Topping, a new medical advisory Committee on Research to pass on all grants for research projects supported by March of Dimes funds was announced by Basil O'Connor, president of the foundation. The new committee replaces the former Committee on Virus Research and Epidemiology, which had eight members. It includes experts in the fields of arthritis, congenital malformations, virology, biochemistry, bacteriology, genetics, and immunology. Dr. Thomas B. Turner, dean of the Medical Faculty, Johns Hopkins University, Baltimore, is vice-chairman of the committee.

Centennial for Dental Association.—"A century of health service" will be evaluated in a special centennial issue of *The Journal of the American Dental Association* to be published in June. Many authorities have contributed to the 256-page number commemorating the 100th anniversary of the association. Congratulatory messages, ranging from those from President Eisenhower, the U. S. Congress, and Secretary Flemming of the Department of Health, Education, and Welfare to the presidents of such groups as the American Medical Association, American Hospital Association, American Bar Association, World Health Organization, American Public Health Association, American Pharmaceutical Association, National Dairy Council, and the American Public Welfare Association will be included. The publication will also contain a number of historical pictures indicating highlights in organized dentistry's growth as well as pictures showing activities in which the profession is engaged today.

Arrangements, Transportation for World Meetings.—Dr. Louis H. Bauer, secretary-general, World Medical Association, has announced that the association has made initial arrangements for providing its participants at the Second World Conference on Medical Education, Chicago, Aug. 30-Sept. 4, and the eighth general assembly of the World Medical Association (Montreal, Canada, Sept. 7-12) with a special chartered transportation plan. Members of the national medical associations and their families are eligible to apply for reservations on the chartered flights. Dr. Bauer noted that the conference dates fell during the "peak season" of tourist travel which might make it more difficult for the participants to obtain the regular commercial reservations they wished, and that the plan would provide substantial financial savings for the member associations, their delegates, and participants at the meetings. Additional information may be obtained from The World Medical Association, 10 Columbus Circle, New York 19.

Maxillofacial Surgeons Meet in Chicago.—The 13th annual meeting of the American Society of Maxillofacial Surgeons will be held May 10-13 at the Palmer House, Chicago. Five symposiums will be presented under the following titles and moderators:

Oral Lesions, Dr. Casper Epsteen, Chicago.
Surgical Repair of Cleft Palate, Dr. Fred S. Dunn, New York City.
Treatment of Malignant Diseases of the Head and Neck, Dr. Arthur Dick, Washington, D. C.
Tumors of the Salivary Glands, Dr. Orion H. Stuteville, Chicago.
Traumatic Injuries of the Face and Head, Dr. Walter W. Dalitsch, Chicago.

Two movies are planned: "Mandibular Prognathism" and "Open Vertical Subcondylectomy for Correction of Prognathism." The dinner is planned for May 12, 8 p.m. A panel on "Burns of the Face and Mouth," moderated by Dr. Louis W. Schultz, Chicago, will conclude the meeting. For information, write Dr. O. H. Stuteville, Secretary, American Society of Maxillofacial Surgeons, 700 N. Michigan Ave., Chicago 11.

Cancer Among Children.—Cancer currently causes about 4,000 deaths a year in the United States among children under 15 years of age, it is reported by statisticians of the Metropolitan Life Insurance Company. This is nearly 50% higher than the toll only a decade ago, reportedly reflecting in part the rapid growth of the child population. In the 5-14 age group, cancer takes more lives than any other disease, accounting for one out of every four deaths from disease. The death rate from cancer in childhood is highest at the preschool ages, rising gradually to a peak between ages three and four, the statisticians point out. At each of the childhood ages, the rate among boys exceeds that among girls by one-fifth. Leukemia is the most common form of cancer in childhood, being responsible for nearly half the cancer death toll at ages under 15. Cancers of the nervous system—chiefly the brain—constitute the second most frequent category and account for about one-fifth of all deaths from cancer in childhood. Other fairly frequent sites of childhood cancer are the kidney and bone.

Grants for Virus Research.—The sum of $1,040,750 was appropriated by the Rockefeller Foundation for the support of its operating program in the investigation and control of virus diseases during the calendar year 1959. This program is conducted by members of the foundation's professional staff in central laboratories in New York City and in cooperative field laboratories in India, South Africa, Trinidad, Brazil, and California. The program is at present concentrated on the viruses which are transmitted by insects and ticks and which infect birds, the lower mammals, and man. The program began in 1949 with the study of about 15 viruses which had been discovered but not identified during work on the yellow fever virus. This investigation culminated in the production of a vaccine which has reportedly reduced yellow fever to a minor role as a public health threat. More than 70 "arbor" (ARthropod-BORne) viruses have been isolated and identified in the intervening years, and the relation of a number of them to serious human infections and to animal diseases of economic importance has been established.

Morbidity Report.—About 438 million acute illnesses involving either restricted activity or medical attention or both occurred among the American people during the year ending June 30, 1958. The number of such illnesses averaged 2.6 for every person in the population. The figures are from the U. S. National Health Survey, which shows that the incidence was highest in the youngest age groups and decreased progressively in each older age group. The rates ranged from an average of 4 illnesses among children under 5 to 1.6 illnesses per person 65 or over. The incidence rate among females was slightly higer than for males. Respiratory ailments accounted for 65% of all the illness involving medical attention or restricted activity. The respiratory illnesses caused 1,172 million days of restricted activity, or an average of 7 days per person. About half of this time involved bed disability. The days of restricted activity included 219 million days lost from work, and 196 million days lost from school. The incidence of these illnesses reportedly reflects the impact of the Asian influenza epidemic which occurred during the year.

Plan Nation-Wide Atomic Fall-Out Measurements.—The U. S. will have a nation-wide monitoring network to measure atomic fall-out "within a matter of months," Mr. Lewis Berry, assistant director for plans and operations of the Office of Civil Defense Mobilization (OCDM) reported March 12 at the University of Michigan, Ann Arbor. The network would be established in existing federal installations, including airport control towers, weather bureaus, and forest-ranger stations. Mr. Berry said nonmilitary defense planning "is now over the hump," citing these signs of progress:

1. Preparation of a national plan for nonmilitary defense, which is now being supplemented with state and local plans;
2. Development of matching fund programs for training of personnel and other federal-state activities in this field; and
3. Planning for continuity of government at all levels in the event of a national emergency or enemy attack.

OCDM is encouraging states to select alternate sites for government headquarters, to provide for preservation of key records, and to develop plans for complete use of state personnel and facilities in emergencies, Mr. Berry said.

Committee on Education for National Foundation.—To guide the expanded program of education for the health professions of The National Foundation as it moves into the fields of birth defects and arthritis, a new Committee on Professional Education has been announced by Basil O'Connor, president of the organization (originally known as the National Foundation for Infantile Paralysis). The committee is headed by Dr. Thomas B. Turner, dean of the Medical Faculty, Johns Hopkins University, Baltimore. Dr. Turner is also vice-chairman of the National Foundation Committee on Research. The function of the committee is to advise The National Foundation in allocating March of Dimes funds to help increase the nation's reservoir of qualified scientific investigators and trained health personnel. In its 21-year history, March of Dimes assistance for specialized training has been given to more than 7,000 students. One of the first undertakings of the committee will be to guide the development of The National Foundation's new 12-million-dollar health scholarship plan, wherein 505 four-year college scholarships will be offered annually in nursing, medical social work, physical therapy, occupational therapy, and medicine.

Awards for Research.—Nine U. S. scientists received Borden Awards of a gold medal and $1,000 during 1958 "for outstanding research achievements." The 1958 winners' scientific contributions are reviewed in an annual directory released by the Borden Company Foundation. Administered by professional and scientific associations, 161 Borden awards have been made by the foundation since the program was initiated in 1937. The administering groups and the 1958 winners are:

The American Chemical Society—William G. Gordon, Ph.D., Eastern Regional Research Laboratory, U. S. Department of Agriculture, for contributions in the fundamental chemistry of milk products.

The American Dairy Science Association—W. James Harper, Ph.D., Ohio State University, for contributions in dairy bacteriology and biochemistry.

The American Dairy Science Association—Jay L. Lush, Ph.D., Iowa State College, for research in the genetics and breeding of dairy cattle.

The American Home Economics Association—May S. Reynolds, Ph.D., University of Wisconsin, for research in protein metabolism.

The Association of American Medical Colleges—Dr. Severo Ochoa, department of biochemistry, New York University, for research on the enzymatic mechanisms of metabolism.

The American Institute of Nutrition—Lemuel D. Wright, Ph.D., Graduate School of Nutrition, Cornell University, for the development of microbiological assay procedures for vitamins and the discovery of biocytin.

The American Academy of Pediatrics—Dr. Charles D. May, College of Physicians and Surgeons, Columbia University, for contribution to long-term metabolic studies of infants fed human milk.

The Loultry Science Association—George M. Briggs, Ph.D., Laboratory of Nutrition and Endocrinology, National Institutes of Health, Bethesda, Md., for basic research in the area of Nutritional interrelationships.

The American Veterinary Medical Association—Chester A. Manthei, D.V.M., U. S. Department of Agriculture, Beltsville, Md., for research in the control and eradication of brucellosis in dairy cattle.

Medical Aid Team Goes to Viet Nam.—The first contingent of a U. S. medical team left San Francisco March 30 on an emergency volunteer mission to the Cho Ray Hospital at the University of Saigon, Viet Nam. They are Dr. Richard H. Overholt, clinical professor of surgery, Tufts Medical School, Boston; Dr. Max S. Sadove, professor of surgery (anesthesiology), University of Illinois Medical College, Chicago; Miss Kathryn O'Donnell, R.N., chief nurse of the thoracic clinic, Overholt Clinic in Boston; and Miss Shirley S. Wolf, R.N., surgical nurse of the University of Maryland Medical School Hospital, Baltimore. Sponsored by MEDICO, the group, eventually to total seven, is responding to a request of the government of Viet Nam for aid in "clearing up a backlog of pulmonary tuberculosis cases threatening to overwhelm the limited medical facilities" of that Asian country. They will also demonstrate up-to-date methods of treatment of lung diseases. Tuberculosis is the major health menace of Viet Nam, accounting for 80% of deaths. Drs. Overholt and Sadove will be in Saigon from April 1 to June 1. They will be jointed on May 1 by Dr. James B. Littlefield, assistant professor of surgery, University of Virginia Medical School, Charlottesville, and Dr. Peter J. Safar, chief of anesthesiology, Baltimore City Hospitals, both of whom will remain until July 1. The remaining member of the team, Dr. John M. Keshishian, instructor in surgery, George Washington University Medical School, Washington, D. C., plans to be at the Saigon Hospital from June 15 to Aug. 15. Nurses Wolf and O'Donnell will remain for four months, April 1 to Aug. 1. MEDICO (Medical International Cooperation) is a private, nonprofit and nonsectarian organization for American medical assistance to the newly developing countries of Asia, Africa, and Latin America. Its honorary patron is Dr. Albert Schweitzer, and its secretary general is Dr. Peter D. Comanduras. Among the other medical projects it supports are the work of Dr. Thomas A. Dooley in Laos, Dr. Gordon Seagrave (the "Burma Surgeon") in Burma, Dr. Albert Schweitzer in Gabon, Central Africa; Dr. Theodor Binder in Peru, Dr.

Karl Erben in Pakistan, and Dr. Louis Mars in Haiti. MEDICO is a division of the International Rescue Committee, a 25-year-old refugee welfare organization.

CORRECTIONS

Nerve Block for Surgery of the Hand and Forearm.—In Dr. Preston J. Burnham's paper entitled "Simple Regional Nerve Block for Surgery of the Hand and Forearm" (Feb. 28, page 941) in the third line of the second paragraph the word "accomplished" was in error and the word should have been "accompanied."

Poliomyelitis Vaccine Preparation and Administration.—In the article by Dr. Salk (April 18, page 1829) entitled "Poliomyelitis Vaccine Preparation and Administration," the last sentence of the initial boxed summary should have read as follows: The substantial rise in antibody titer induced by a fourth dose of a selected lot of vaccine suggested that failure of previous injection was probably due to the use of vaccines of less than optimal potency.

EXAMINATIONS AND LICENSURE

MEDICAL SPECIALTY BOARDS

American Board of Anesthesiology: *Written.* Various locations, July 8, 1960. Final date for filing application is January 8. Sec., Dr. Forrest E. Leffingwell, 217 Farmington Ave., Hartford 5, Conn.

American Board of Dermatology: *Written.* Several Cities, Oct. 5. *Oral.* Oklahoma City, Jan. 15-18, 1960. The final date for filing all applications is July 1, 1959. Sec., Dr. Beatrice M. Kesten, One Haven Ave., New York 32.

American Board of Internal Medicine: *1959 Schedule—Written*, Oct. 19. Final date for filing application was May 1. *Oral.* For candidates on the West Coast, Portland, Ore., Sept. 9-12. Final date for filing application was March 1. *Oral.* For candidates on the East Coast, Nov. 6-7, 9-10. Final date for filing application was March 1. Sec.-Treas., Dr. William A. Werrell, One West Main St., Madison 3, Wis.

American Board of Neurological Surgery: Examination given twice annually, in the spring and fall. In order to be eligible a candidate must have his application filed at least six months before the examination time. Sec., Dr. Leonard T. Furlow, Washington University School of Medicine, St. Louis 10.

American Board of Obstetrics and Gynecology: Applications for certificates, new and reopened, Part I, and requests for re-examination Part II are now being accepted. All candidates are urged to make such application at the earliest possible date. Deadline date for receipt of applications is August 1, 1959. No applications can be accepted after that date. Sec., Dr. Robert L. Faulkner, 2105 Adelbert Road, Cleveland 6, Ohio.

American Board of Ophthalmology: *Oral.* Philadelphia, June 2-6; St. Louis, Oct. 6-10. *Written.* January 1960 in various cities. Applications for the 1960 written examination must be filed before July 1. Sec., Dr. Merrill J. King, Box 236, Cape Cottage Branch, Portland, Maine.

American Board of Orthopaedic Surgery: *Part II.* Chicago. Jan. 19-21, 1960. The deadline for the receipt of application is Aug. 15, 1959. Sec., Dr. Sam W. Banks, 116 South Michigan Ave., Chicago 3.

American Board of Otolaryngology: *Oral.* Chicago, Oct. 5-9. Final date for filing application was April 1. Sec., Dr. Dean M. Lierle, University Hospitals, Iowa City.

American Board of Pediatrics: *Written.* January 1960. Exec. Sec., Dr. John McK. Mitchell, 6 Cushman Road, Rosemont, Pa.

American Board of Physical Medicine and Rehabilitation: *Written, Part I,* and *Oral, Part II.* Philadelphia, June 12-13. Final date for filing application was February 15. Sec., Dr. Earl C. Elkins, 200 First St., S. W., Rochester, Minn.

American Board of Plastic Surgery: *Oral and Written.* Miami, Fla., Oct. 15-17. Final date for submitting case reports is July 1. Corresponding Secretary, Miss Estelle E. Hillerich, 4647 Pershing Ave., St. Louis 8, Mo.

American Board of Proctology: *Oral and Written.* Philadelphia, September. Final date for filing application was March 15. Sec., Dr. Stuart T. Ross, 520 Franklin Ave., Garden City, N. Y.

American Board of Psychiatry and Neurology: Chicago, Oct. 19-20; New York, Dec. 14-15; San Francisco, Mar. 14-15, 1960. Training credit for full time psychiatric and/or neurologic assignment in unapproved military programs or services between the dates of Jan. 1, 1950 and Jan. 1, 1954 was terminated on Jan. 1, 1959. Sec., Dr. David A. Boyd, 102-110 Second Ave. S. W., Rochester, Minn.

American Board of Radiology: *Examination.* Chicago, June 2-4. The deadline for filing applications was April 1. Washington, Dec. 6-9. Deadline for filing application is July 1. Candidates examined in Diagnostic Roentgenology may expect to be examined in Physics. A Special Examination in Nuclear Medicine (for diplomates in Radiology or Therapeutic Radiology) will not be given in June 1959. Candidates desiring this examination will be accommodated at the meeting of the Board in Washington, D. C. on December 5. Deadline for filing application is August 1. Sec., Dr. H. Dabney Kerr, Kahler Hotel Bldg., Rochester, Minn.

American Board of Surgery: *Written* examinations (Part I) will be held on December 2, 1959 at various centers to be announced later. Candidates are urged to apply several months before completion of training requirements although the closing date for filing applications is August 1. Those completing training requirements after September 30 cannot be considered for the Part I examination in December of the same year. *Part II.* Columbus, Ohio, May 14-15. Sec., Dr. John B. Flick, 1617 Pennsylvania Blvd., Philadelphia 3.

Board of Thoracic Surgery: *Written.* Various centers throughout the country, September 1959. *Final date for filing application* is July 1. *Oral.* September. *Final date for filing application* is July 1. Sec., Dr. William M. Tuttle, 1151 Taylor Ave., Detroit 2, Mich.

American Board of Urology: *Written.* Approximately 25 cities throughout the country, December 4, 1959. *Oral-Clinical* and *Examination in Pathology.* Chicago, February 1960. *Final date for filing application is* Sept. 1, 1959. Sec., Dr. William Niles Wishard, 30 Westwood Rd., Minneapolis 26, Minn.

DEATHS

Connell, Isce Lee Ⓜ Jacksonville, Fla.; University of Chicago, The School of Medicine, 1930; veteran of World Wars I and II; recipient of University of Chicago Alumni Foundation Award of Merit for leadership in fund raising; served as health officer of Cleburne County and Clarke County, Ala.; died Feb. 14, aged 66.

Crooks, William James Ⓜ Clinton, N. J.; Tufts College Medical School, Boston, 1932; on the staff of the Clara Maas Hospital in Belleville; died Feb. 14, aged 57.

D'Amico, Joseph Ⓜ New Haven, Conn.; Regia Universitá degli Studi di Roma. Facoltà di Medicina e Chirurgia, Italy, 1937; interned at Hospital of St. Raphael; member of the American Academy of General Practice; died Feb. 11, aged 51.

Darling, Frank Edward Sr. Ⓜ Milwaukee; Wisconsin College of Physicians and Surgeons, Milwaukee, 1903; served on the faculty of his alma mater; at one time registrar of vital statistics for the city health department; during World War I was in charge of surgical services at a base hospital in France; associated with St. Joseph's Hospital in West Bend, St. Alphonsus Hospital in Port Washington, St. Joseph's Hospital in Hartford, and St. Michael Hospital; died Feb. 13, aged 79.

Davis, Emmer Palmore, Oklahoma City, Okla.; University of Oklahoma School of Medicine, Oklahoma City, 1912; veteran of World War I; served with the Veterans Administration in Phoenix, Ariz.; died Feb. 3, aged 74.

Dessau, Frederick Isaac Ⓜ Nyack, N. Y.; born in Hamburg, Germany, March 23, 1910; Hamburgische Universität Medizinische Fakultät, Hamburg, Germany, 1937; specialist certified by the American Board of Pathology; certified by the National Board of Medical Examiners; member of the American Trudeau Society, American Association of Pathologists and Bacteriologists, and the College of American Pathologists; head pathologist at the Lederle Laboratories at Pearl River; instructor of pathology at Harvard Medical School in Boston from 1939 to 1943; research fellow at Yale University in New Haven, Conn., from 1939 to 1943; died in the Presbyterian Hospital in New York City Feb. 23, aged 48.

Dorsey, Thomas Manning Ⓜ Louisville, Ky.; University of Louisville Medical Department, 1912; served overseas during World War I; formerly on the faculty of his alma mater; associated with SS Mary and Elizabeth Hospital, St. Anthony's Hospital, and Louisville City Hospital; died in St. Joseph Infirmary Feb. 13, aged 72.

Downs, Lawrence Ethridge Ⓜ Los Angeles; University of Louisville (Ky.) Medical Department, 1912; member of the International College of Surgeons; on the governor's staff of the examining board in the state of Kansas during World War I; served on the Los Angeles examining board of Selective Service during World War II; a member of the Hollywood Academy of Medicine, from which organization he received an award on Feb. 12, 1959, for 25 years of active service; one of the founders of the Hollywood Presbyterian Hospital, where he was on the staff for 25 years; died Feb. 18, aged 75.

Dragoo, Farrol Andrew Ⓜ Middletown, Ind.; Indiana University School of Medicine, Indianapolis, 1932; veteran of World War II; on the staff of St. John's Hospital in Anderson and the Henry County Hospital in New Castle, where he died Feb. 1, aged 54.

Du Bois, Eugene Floyd, New York City; born in West New Brighton, N. Y., June 4, 1882; Columbia University College of Physicians and Surgeons, New York City, 1906; specialist certified by the American Board of Internal Medicine; since 1950 emeritus professor of physiology at Cornell University Medical College, where he joined the faculty in 1910 as an instructor in applied pharmacology, subsequently serving as associate professor of medicine, professor of medicine, and professor of physiology; medical director of the Russell Sage Institute of Pathology from 1913 to 1950; veteran of World War I and was awarded the Navy Cross; served during World War II; chairman of the committee on aviation medicine of the National Research Council from 1940 to 1945; member and past-vice-president of the Association of American Physicians and in 1947 received its Kober Medal; member of the American Society of Clinical Investigation and the Aero Medical Association; fellow of the American College of Physicians and in April was to have received its John Phillips Memorial Award in Chicago; from 1932 to 1941 physician in chief at the New York Hospital; for many years associated with the Bellevue Hospital; author of "Basal Metabolism in Health and Disease"; received the degree of doctor of science, University of Rochester, in 1948; died Feb. 12, aged 76.

Ⓜ Indicates Member of the American Medical Association.

South Bend, Ind.; Univer-
School of Medicine, Baltimore,
World War I; served as superin-
County Tuberculosis Hospital;
and St. Joseph's hospitals;

Lincoln, Neb.; John A.
Omaha, 1913; veteran
member of the board
member of the state
consultant to the Veterans
rehabilitation work with dis-
died in St. Joseph's Hospital,
Feb. 6, aged 69.

Otto Ⓜ Colorado Springs, Colo.; Eberhard-Karls-Universität-Medizinische Fakultät, Tübingen, Wurtemberg, Germany, 1900; member of the American Trudeau Society; served a residency at the Modern Woodmen of America Sanatorium in Woodmen; resident at the Cragmor Foundation; associated with Glockner and St. Francis hospitals; died Feb. 9, aged 82.

Failmezger, Theodore Richard Ⓜ Clearwater, Fla.; born in Brooklyn Aug. 20, 1904; Jefferson Medical College of Philadelphia, 1934; also a graduate in pharmacy; specialist certified by the American Board of Internal Medicine; interned at the Orange Memorial Hospital in Orange, N. J.; served a residency in medicine at the New York Post-Graduate Medical School and Hospital in New York City; member of the American Rheumatism Association, American Geriatrics Association, New Jersey Heart Association, and the New Jersey Diabetes Association; fellow of the American College of Physicians; veteran of World War II; at one time practiced in Madison, N. J., where he was president of the board of health from 1937 to 1939, and from 1937 to 1957 physician to Drew University; served on the staffs of the New York Post-Graduate Medical School and Hospital in New York City, New Jersey Orthopaedic Hospital in Orange, N. J., and the All Souls and Morristown Memorial hospitals in Morristown, N. J.; on the staff of the Morton Plant Hospital; died Feb. 7, aged 54.

Ferrell, Grover C., Eldorado, Ill.; Chicago College of Medicine and Surgery, 1912; past-president of the Saline County Medical Society
eon for
Louis-
New York Central, Illi

chairman of the South Carolina School Boards; on the staffs of the Saunders Memorial Hospital and McLeod Infirmary, where he died Feb. 7, aged 63.

Flude, John Meredith Ⓜ Long Beach, Calif.; Jefferson Medical College of Philadelphia, 1918; served as western field representative of the American Society for the Control of Cancer; formerly medical supervisor for the department of social security in the state of Washington; associated with the Community Hospital and the Seaside Hospital, where he died Feb. 9, aged 65.

Fuller, Homer Gifford Ⓜ Washington, D. C.; George Washington University School of Medicine, Washington, 1904; specialist certified by the American Board of Urology; member of the American Association of Genito-Urinary Surgeons and the American Urological Association; fellow of the American College of Surgeons; served on the faculty of his alma mater; for many years on the staff of the Garfield Memorial Hospital; died in the Doctor's Hospital Feb. 13, aged 80.

Gebert, Clara McGrew Ⓜ Valley Park, Mo.; St. Louis College of Physicians and Surgeons, 1922; died Feb. 18, aged 74.

Gladstone, William R. Ⓜ Walton, N. Y.; Bellevue Hospital Medical College, New York City, 1898; served on the staff of the Delaware Valley Hospital; died Feb. 2, aged 87.

Gold, Joseph Brand Ⓜ Santa Fe, N. M.; University of Pittsburgh School of Medicine, 1914; served overseas during World War I; formerly practiced in Pittsburgh, where he was on the staffs of Mercy and Passavant hospitals; died Feb. 8, aged 69.

Goodrich, William Albert Ⓜ Hartford, Conn.; born in Waterbury, Oct. 4, 1909; Columbia University College of Physicians and Surgeons, New York City, 1935; specialist certified by the American Board of Radiology; member of the American Roentgen Ray Society and Radiological Society of North America; counselor for Connecticut of the American College of Radiology; a past-president and secretary treasurer of the radiology section of the Connecticut State Medical Society; veteran of World War II; on the staffs of the Charlotte Hungerford Hospital in Torrington, Johnson Memorial Hospital in Stafford Springs, and the Hartford Hospital, where he died Feb. 11, aged 49.

, Edmund Alphonse Ⓜ Toledo, Ohio; Uni-
Michigan Medical School, Ann Arbor,
St. Vincent's Hospital Jan. 26, aged 55.

ramwell Ⓜ Austin, Minn.; Western
School of Medicine, Cleveland,
president of the Mower County
a trustee of the Macalester Col-
staff member of St. Olaf Hospital,
. 20, aged 73.

Groves, Robert Burwell, Lowell, N. C.; Medical College of Virginia, Richmond, 1924; past-president of the Gaston County Medical Society; veteran of World War I; a member of the staffs of Gaston Memorial and Garrison General hospitals; died in Charlotte Feb. 8, aged 60.

Gsell, Jacob Franklin Ⓜ Wichita, Kan.; Rush Medical College, Chicago, 1895; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; charter member and first president of the Sedgwick County Medical Society; past-president of the Kansas Medical Society; on the staff of St. Francis Hospital; died Feb. 12, aged 85.

Hall, Allon Killough, La Porte, Texas; Tulane University School of Medicine, New Orleans, 1946; member of the American Academy of General Practice; interned at Scott and White Hospital in Temple; served a residency at the Veterans Administration Hospital in Houston; for two years a flight surgeon in the Air Force; associate professor of ophthalmology at Baylor University College of Medicine in Houston; on the staff of San Jacinto Memorial Hospital in Baytown; died Feb. 7, aged 35.

Harber, Harry Paul Ⓜ Dallas, Texas; University of Texas School of Medicine, Galveston, 1917; on the faculty of Baylor University College of Medicine in Houston; on the staffs of the Baylor University, St. Paul's and Medical Arts hospitals; died Feb. 3, aged 68.

Harris, Benjamin Henry Ⓜ Philadelphia; Temple University School of Medicine, Philadelphia, 1919; died Feb. 8, aged 63.

Harrison, H. Wesley Ⓜ Detroit; University of Michigan Medical School, Ann Arbor; 1924; medical director of the Alcoa–Aluminum Company of America; an executive board member and secretary treasurer of the medical staff at St. Joseph Mercy Hospital, where he died Feb. 3, aged 58.

Hebald, Selian Ⓜ New York City; Columbia University College of Physicians and Surgeons, New York City, 1919; received a Presidential Citation for his work with the Selective Service system during World War II; founding member of the American Academy of Allergy; associated with the Hospital for Joint Diseases and Roosevelt Hospital; died Feb. 17, aged 63.

Hines, Sidney Gilbert, Grayson, La.; Medical Department of Tulane University of Louisiana, New Orleans, 1908; died in Alexandria Feb. 2, aged 75.

Hollander, Lester Ⓜ Pittsburgh; University of Pittsburgh School of Medicine, 1912; specialist certified by the American Board of Dermatology and Syphilology; member of the American Academy of Dermatology and Syphilology and the American Radium Society; fellow of the American College of Physicians; founder and director of the Pittsburgh Skin and Cancer Foundation; affiliated with the Montefiore Hospital; died Feb. 2, aged 68.

Holmes, Prince Albert, Mount Vernon, Mo.; St. Louis College of Physicians and Surgeons, 1909; died in Springfield Baptist Hospital in Springfield Feb. 2, aged 79.

Howard, Walter M. Ⓜ Joplin, Mo.; Washington University School of Medicine, St. Louis, 1930; member of the staffs of Freeman Hospital and St. John's Hospital, where he died Jan 7, aged 53.

Hull, Chloe Frances, Laramie, Wyo.; Medical College of Indiana, Indianapolis, 1902; for many years a medical missionary in India; died in the Wyoming State Hospital, Evanston, Jan. 26, aged 84.

Jakobson, Ber, Rome, N. Y.; University of Kharkov Faculty of Medicine, Russia, 1914; medical officer in the Russian Army during World War I; associated with the Rome State School; died in Rome Hospital Feb. 4, aged 68.

Jensen, Gordon Melvin Ⓜ Logan, Utah; Medical College of South Carolina, Charleston, 1943; interned at St. Vincent's Hospital in Portland, Ore.; formerly a resident at the Veterans Administration Hospital in Salt Lake City; veteran of World War II; on the staffs of the Latter Day Saints Hospital; died in Salt Lake City Feb. 3, aged 45.

Johnston, Robert Sherwood, Chana, Ill.; Illinois Medical College, Chicago, 1904; served on the staff of St. Anthony Hospital in Rockford; died Feb. 5, aged 86.

Kallus, Edward John Ⓜ Colonel, U. S. Army, retired, Lufkin, Texas; University of Texas School of Medicine, Galveston, 1922; entered the regular Army in 1924; veteran of World War II; retired July 31, 1948; member of the Radiological Society of North America; died Feb. 6, aged 61.

Kamerer, Russell Peter Ⓜ Perryopolis, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1907; died in the Western Pennsylvania Hospital, Pittsburgh, Feb. 9, aged 80.

Kent, Louis Clarence, Manchester, Mich.; Detroit College of Medicine, 1901; served as village president, president of the Manchester school board, and village council member; died in the Herrick Memorial Hospital, Tecumseh, Feb. 21, aged 91.

Kenyon, Frances Aureola Ⓜ Woodville, R. I.; the Hahnemann Medical College and Hospital, Chicago, 1894; for 32 years medical examiner of Washington County; served as Richmond town health officer and school physician; for many years school

Duggan, James Archie Ⓜ South Bend, Ind.; University of Maryland School of Medicine, Baltimore, 1912; veteran of World War I; served as superintendent of St. Joseph County Tuberculosis Hospital; associated with Memorial and St. Joseph's hospitals; died Feb. 10, aged 69.

Edwards, Charles B., Lincoln, Neb.; John A. Creighton Medical College, Omaha, 1913; veteran of World War I; served as a member of the board of education in Kearney; member of the state board of health; formerly consultant to the Veterans Administration for rehabilitation work with disabled veterans; died in St. Joseph's Hospital, Phoenix, Ariz., Feb. 6, aged 69.

Einstein, Otto Ⓜ Colorado Springs, Colo.; Eberhard-Karis-Universität-Medizinische Fakultät, Tübingen, Würtemberg, Germany, 1900; member of the American Trudeau Society; served a residency at the Modern Woodmen of America Sanatorium in Woodmen; resident at the Cragmor Foundation; associated with Glockner and St. Francis hospitals; died Feb. 9, aged 82.

Failmezger, Theodore Richard Ⓜ Clearwater, Fla.; born in Brooklyn Aug. 20, 1904; Jefferson Medical College of Philadelphia, 1934; also a graduate in pharmacy; specialist certified by the American Board of Internal Medicine; interned at the Orange Memorial Hospital in Orange, N. J.; served a residency in medicine at the New York Post-Graduate Medical School and Hospital in New York City; member of the American Rheumatism Association, American Geriatrics Association, New Jersey Heart Association, and the New Jersey Diabetes Association; fellow of the American College of Physicians; veteran of World War II; at one time practiced in Madison, N. J., where he was president of the board of health from 1937 to 1939, and from 1937 to 1957 physician to Drew University; served on the staffs of the New York Post-Graduate Medical School and Hospital in New York City, New Jersey Orthopaedic Hospital in Orange, N. J., and the All Souls and Morristown Memorial hospitals in Morristown, N. J.; on the staff of the Morton Plant Hospital; died Feb. 7, aged 54.

Ferrell, Grover C., Eldorado, Ill.; Chicago College of Medicine and Surgery, 1912; past-president of the Saline County Medical Society; surgeon for the New York Central, Illinois Central and Louisville and Nashville Railroad companies; associated with Ferrell Hospital, where he died Feb. 4, aged 72.

Finklea, Orion Tiverton Ⓜ Florence, S. C.; Medical College of South Carolina, Charleston, 1918; member of the Southeastern Surgical Congress and the American Urological Association; fellow of the American College of Surgeons; for eight years chairman of the city school board and two years chairman of the South Carolina School Boards; on the staffs of the Saunders Memorial Hospital and McLeod Infirmary, where he died Feb. 7, aged 63.

Flude, John Meredith Ⓜ Long Beach, Calif.; Jefferson Medical College of Philadelphia, 1918; served as western field representative of the American Society for the Control of Cancer; formerly medical supervisor for the department of social security in the state of Washington; associated with the Community Hospital and the Seaside Hospital, where he died Feb. 9, aged 65.

Fuller, Homer Gifford Ⓜ Washington, D. C.; George Washington University School of Medicine, Washington, 1904; specialist certified by the American Board of Urology; member of the American Association of Genito-Urinary Surgeons and the American Urological Association; fellow of the American College of Surgeons; served on the faculty of his alma mater; for many years on the staff of the Garfield Memorial Hospital; died in the Doctor's Hospital Feb. 13, aged 80.

Gebert, Clara McGrew Ⓜ Valley Park, Mo.; St. Louis College of Physicians and Surgeons, 1922; died Feb. 18, aged 74.

Gladstone, William R. Ⓜ Walton, N. Y.; Bellevue Hospital Medical College, New York City, 1898; served on the staff of the Delaware Valley Hospital; died Feb. 2, aged 87.

Gold, Joseph Brand Ⓜ Santa Fe, N. M.; University of Pittsburgh School of Medicine, 1914; served overseas during World War I; formerly practiced in Pittsburgh, where he was on the staffs of Mercy and Passavant hospitals; died Feb. 8, aged 69.

Goodrich, William Albert Ⓜ Hartford, Conn.; born in Waterbury, Oct. 4, 1909; Columbia University College of Physicians and Surgeons, New York City, 1935; specialist certified by the American Board of Radiology; member of the American Roentgen Ray Society and Radiological Society of North America; counselor for Connecticut of the American College of Radiology; a past-president and secretary treasurer of the radiology section of the Connecticut State Medical Society; veteran of World War II; on the staffs of the Charlotte Hungerford Hospital in Torrington, Johnson Memorial Hospital in Stafford Springs, and the Hartford Hospital, where he died Feb. 11, aged 49.

Gomolski, Edmund Alphonse Ⓜ Toledo, Ohio; University of Michigan Medical School, Ann Arbor, 1930; died in St. Vincent's Hospital Jan. 26, aged 55.

Grise, William Bramwell Ⓜ Austin, Minn.; Western Reserve University School of Medicine, Cleveland, 1914; served as president of the Mower County Medical Society; a trustee of the Macalester College in St. Paul; a staff member of St. Olaf Hospital, where he died Feb. 20, aged 73.

Groves, Robert Burwell, Lowell, N. C.; Medical College of Virginia, Richmond, 1924; past-president of the Gaston County Medical Society; veteran of World War I; a member of the staffs of Gaston Memorial and Garrison General hospitals; died in Charlotte Feb. 8, aged 60.

Gsell, Jacob Franklin Ⓜ Wichita, Kan.; Rush Medical College, Chicago, 1895; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; charter member and first president of the Sedgwick County Medical Society; past-president of the Kansas Medical Society; on the staff of St. Francis Hospital; died Feb. 12, aged 85.

Hall, Allon Killough, La Porte, Texas; Tulane University School of Medicine, New Orleans, 1946; member of the American Academy of General Practice; interned at Scott and White Hospital in Temple; served a residency at the Veterans Administration Hospital in Houston; for two years a flight surgeon in the Air Force; associate professor of ophthalmology at Baylor University College of Medicine in Houston; on the staff of San Jacinto Memorial Hospital in Baytown; died Feb. 7, aged 35.

Harber, Harry Paul Ⓜ Dallas, Texas; University of Texas School of Medicine, Galveston, 1917; on the faculty of Baylor University College of Medicine in Houston; on the staffs of the Baylor University, St. Paul's and Medical Arts hospitals; died Feb. 3, aged 68.

Harris, Benjamin Henry Ⓜ Philadelphia; Temple University School of Medicine, Philadelphia, 1919; died Feb. 8, aged 63.

Harrison, H. Wesley Ⓜ Detroit; University of Michigan Medical School, Ann Arbor; 1924; medical director of the Alcoa–Aluminum Company of America; an executive board member and secretary treasurer of the medical staff at St. Joseph Mercy Hospital, where he died Feb. 3, aged 58.

Hebald, Selian Ⓜ New York City; Columbia University College of Physicians and Surgeons, New York City, 1919; received a Presidential Citation for his work with the Selective Service system during World War II; founding member of the American Academy of Allergy; associated with the Hospital for Joint Diseases and Roosevelt Hospital; died Feb. 17, aged 63.

Hines, Sidney Gilbert, Grayson, La.; Medical Department of Tulane University of Louisiana, New Orleans, 1908; died in Alexandria Feb. 2, aged 75.

Hollander, Lester Ⓜ Pittsburgh; University of Pittsburgh School of Medicine, 1912; specialist certified by the American Board of Dermatology and Syphilology; member of the American Academy of Dermatology and Syphilology and the American Radium Society; fellow of the American College of Physicians; founder and director of the Pittsburgh Skin and Cancer Foundation; affiliated with the Montefiore Hospital; died Feb. 2, aged 68.

Holmes, Prince Albert, Mount Vernon, Mo.; St. Louis College of Physicians and Surgeons, 1909; died in Springfield Baptist Hospital in Springfield Feb. 2, aged 79.

Howard, Walter M. Ⓜ Joplin, Mo.; Washington University School of Medicine, St. Louis, 1930; member of the staffs of Freeman Hospital and St. John's Hospital, where he died Jan 7, aged 53.

Hull, Chloe Frances, Laramie, Wyo.; Medical College of Indiana, Indianapolis, 1902; for many years a medical missionary in India; died in the Wyoming State Hospital, Evanston, Jan. 26, aged 84.

Jakobson, Ber, Rome, N. Y.; University of Kharkov Faculty of Medicine, Russia, 1914; medical officer in the Russian Army during World War I; associated with the Rome State School; died in Rome Hospital Feb. 4, aged 68.

Jensen, Gordon Melvin Ⓜ Logan, Utah; Medical College of South Carolina, Charleston, 1943; interned at St. Vincent's Hospital in Portland, Ore.; formerly a resident at the Veterans Administration Hospital in Salt Lake City; veteran of World War II; on the staffs of the Latter Day Saints Hospital; died in Salt Lake City Feb. 3, aged 45.

Johnston, Robert Sherwood, Chana, Ill.; Illinois Medical College, Chicago, 1904; served on the staff of St. Anthony Hospital in Rockford; died Feb. 5, aged 86.

Kallus, Edward John Ⓜ Colonel, U. S. Army, retired, Lufkin, Texas; University of Texas School of Medicine, Galveston, 1922; entered the regular Army in 1924; veteran of World War II; retired July 31, 1948; member of the Radiological Society of North America; died Feb. 6, aged 61.

Kamerer, Russell Peter Ⓜ Perryopolis, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1907; died in the Western Pennsylvania Hospital, Pittsburgh, Feb. 9, aged 80.

Kent, Louis Clarence, Manchester, Mich.; Detroit College of Medicine, 1901; served as village president, president of the Manchester school board, and village council member; died in the Herrick Memorial Hospital, Tecumseh, Feb. 21, aged 91.

Kenyon, Frances Aureola Ⓜ Woodville, R. I.; the Hahnemann Medical College and Hospital, Chicago, 1894; for 32 years medical examiner of Washington County; served as Richmond town health officer and school physician; for many years school physician in Hopkinton; chosen in 1956 as "Woman of the Year" by the Westerly Quota Club, of which she was a member; associated with Roger Williams General Hospital in Providence and the Westerly (R. I.) Hospital; died Feb. 15, aged 87.

Kerley, William Wilburn Ⓜ Anadarko, Okla.; Arkansas Industrial University Medical Department, Little Rock, 1898; past-president of the Oklahoma State Medical Association and the Caddo County Medical Society; county coroner; died Feb. 27, aged 87.

Kinsey, Ernest Schroeder Ⓜ Syracuse, N. Y.; Syracuse University College of Medicine, 1941; on the courtesy staff of Syracuse General and Crouse Irving hospitals; died in St. Joseph's Hospital Feb. 18, aged 41.

Klug, Oscar C. Ⓜ East St. Louis, Ill.; Chicago College of Medicine and Surgery, 1913; on the staffs of St. Mary's and Christian Welfare hospitals; died in the Memorial Hospital, Belleville, Feb. 6, aged 77.

Konheim, Vladimir M. Ⓜ Poughkeepsie, N. Y.; Friedrich-Wilhelms-Universität Medizinische Fakultät, Berlin, Prussia, Germany, 1928; served on the staff of the Montefiore Hospital in New York City; consultant in dermatology at the Wassaic State School in Wassaic, Harlem Valley State Hospital, Wingdale, Northern Dutchess Health Center in Rhinebeck, and St. Francis Hospital and the Vassar Brothers Hospital, where he died Feb. 15, aged 66.

Kuntz, Wesley W. Ⓜ Barry, Ill.; Northwestern University Medical School, Chicago, 1905; veteran of the Spanish-American War and World War I; died Feb. 1, aged 83.

LaMont, Wyant Ⓜ Beverly Hills, Calif.; Rush Medical College, Chicago, 1925; certified by the National Board of Medical Examiners; veteran of World War II; member of the American Academy of General Practice; on the staffs of St. John's and Santa Monica hospitals in Santa Monica, and the Culver City (Calif.) Hospital, where he died Feb. 7, aged 59.

Landy, George Raymond Ⓜ Lansing, Mich.; University of Michigan Medical School, Ann Arbor, 1933; served as village health officer and village president in Eau Claire; clinic physician of the Ingham County Health Department; died Feb. 6, aged 52.

Lane, John Loftin Ⓜ Rocky Mount, N. C.; North Carolina Medical College, Davidson, 1906; on the staff of the Rocky Mount Sanitarium, where he died Jan. 30, aged 79.

Lankford, Joseph Frederick Ⓜ Lieut. Commander, U. S. Navy, retired, Albuquerque, N. M.; Indiana University School of Medicine, Indianapolis, 1909; veteran of World War I; entered the Navy in 1920 and retired June 30, 1941; died in the Veterans Administration Hospital Feb. 17, aged 73.

Laughlin, Zach Monroe, Phoenix, Ariz.; Central College of Physicians and Surgeons, Indianapolis, 1905; formerly associated with the Indian Service; died Jan. 30, aged 81.

Lawlor, Edward Francis, Waltham, Mass.; Boston University School of Medicine, 1935; specialist certified by the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology; veteran of World War II and was awarded the Bronze Star; on the staffs of the Massachusetts Eye and Ear Infirmary, Boston, Newton Wellesley Hospital in Wellesley, and Waltham (Mass.) Hospital, where he died Jan. 27, aged 47.

Le Compte, Elmo Mansfield, Springfield, Mo.; University of Louisville (Ky.) Medical Department, 1910; died Jan. 25, aged 76.

Lehrman, Raphael, Bayside, N. Y.; Long Island College Hospital, Brooklyn, 1918; died Dec. 2, aged 70.

McKee, Mary Ada Ⓜ Oil City, Pa.; Woman's Medical College of Pennsylvania, Philadelphia, 1896; past-president of the medical staff and chief of the department of obstetrics at the Oil City Hospital, where in April, 1954, the M. Ada McKee Memorial Library was opened in her honor; in April, 1955, the Oil City Franklin Zonta Club honored her with a "This is Your Life" program and presented her with an honorary membership; in 1955 she received the Golden Deeds Award from the Oil City Exchange Club; died in the Oil City Hospital Feb. 6, aged 87.

McNamara, John Grover, Marion, Ohio; Starling-Ohio Medical College, Columbus, 1910; past-president of the Marion Academy of Medicine; veteran of World War I; past-president of the Marion County Agricultural Society; associated with the Marion General Hospital, where he died Feb. 13, aged 73.

Mackey, William Barry, Reagan, Texas; University of Nashville Medical Department, Nashville, Tenn., 1898; veteran of World War I; died in the Veterans Administration Hospital, Marlin, Jan. 24, aged 88.

Madler, Nicholas Allen Ⓜ Greeley, Colo.; Rush Medical College, Chicago, 1904; fellow of the American College of Surgeons; past-president of the Weld County Medical Society and the Colorado State Medical Society; at one time was the senior chief examiner of Colorado Selective Service System; associated with the Weld County General Hospital; one of the organizers of the Greeley

Kiwanis Club and was its first president in 1922; died in St. Joseph's Hospital, Denver, Feb. 6, aged 77.

Magson, Albert Edward Ⓜ Hightstown, N. J.; Hahnemann Medical College and Hospital of Philadelphia, 1938; died in the McKinley Hospital, Trenton, Feb. 1, aged 46.

Marel, Abraham Hersch Ⓜ Brooklyn; Medizinische Fakultät der Universität, Vienna, Austria, 1913; physician emeritus at Beth-El Hospital and consulting physician at Jewish Chronic Disease Hospital, where he was past-president of the medical board; died Dec. 22, aged 72.

Maxwell, Elmer Stephens Ⓜ Lexington, Ky.; Vanderbilt University School of Medicine, Nashville, Tenn., 1913; specialist certified by the American Board of Pathology; past-president of the Fayette County Medical Society; served overseas during World War I; member of the Central Society for Clinical Research, College of American Pathologists, and the American Society of Clinical Pathology; formerly on the faculty of his alma mater and the University of Louisville School of Medicine; member and past-president of the staff of Good Samaritan Hospital, where in 1956 the board of trustees named the new pathology laboratory after him; member and past-president of the staff of St. Joseph's Hospital, where he died Jan. 9, aged 70.

Mazzacano, Anthony Ferdinand, Flushing, N. Y.; New York Homeopathic Medical College and Flower Hospital, New York City, 1931; veteran of World War II; died Dec. 21, aged 54.

Millberg, William Ⓜ Ashtabula, Ohio; Jefferson Medical College of Philadelphia, 1925; member of the American Academy of General Practice and the International College of Surgeons; on the staff of the Ashtabula General Hospital; died in the Jefferson Hospital, Philadelphia, Feb. 1, aged 61.

Mitchell, Samuel Everett Ⓜ Malden, Mo.; St. Louis University School of Medicine, 1906; died Feb. 4, aged 86.

Morrill, Edgar Miner Ⓜ Fort Collins, Colo.; University of Colorado School of Medicine, Denver, 1932; fellow of the American College of Surgeons; for many years a member of the board of education; president of the District 5 Board of Education; veteran of World War II; on the staffs of the Loveland (Colo.) Memorial Hospital and the Larimer County Hospital; died Feb. 3, aged 50.

Morris, Earl Fayette Ⓜ Nevada, Mo.; St. Louis University School of Medicine, 1926; member of the American Psychiatric Association; veteran of World War I; served on the staff at Larned (Kan.) State Hospital and as clinical director at Western State Hospital at Fort Supply, Okla.; clinical director of the State Hospital No. 3; formerly director of health and physical education, Kansas State Teachers' College in Hays, Kan.; died Feb. 4, aged 65.

Nadler, Carl Seepe Jr. Ⓜ New Orleans; Tulane University School of Medicine, New Orleans, 1941; assistant professor of clinical medicine at his alma mater; president of the Louisiana Society of Internal Medicine; specialist certified by the American Board of Internal Medicine; fellow of the American College of Physicians; veteran of World War II; on the staffs of the Touro Infirmary, Charity, Eye, Ear, Nose and Throat, and Southern Baptist hospitals; died in Metairie, La., Feb. 5, aged 41.

O'Donnell, Leo Joseph Ⓜ New York City; Cornell University Medical College, New York City, 1927; specialist certified by the American Board of Obstetrics and Gynecology; fellow of the American College of Surgeons; associate clinical professor of obstetrics and gynecology at New York University College of Medicine; served on the staff of the Lenox Hill Hospital; died Feb. 7, aged 57.

Orloff, Henry Samuel Ⓜ Philadelphia; Medico-Chirurgical College of Philadelphia, 1913; member of the draft board during World Wars I and II; on the staff of the Albert Einstein Medical Center, Southern Division; died Feb. 6, aged 76.

Palmer, James Newman Ⓜ New York City; McGill University Faculty of Medicine, Montreal, Que., Canada, 1937; member of the American Psychiatric Association; veteran of World War II; associated with the New York Psychoanalytic Institute; died Dec. 2, aged 47.

Pearson, Leb Elmer, Mangum, Okla.; Memphis (Tenn.) Hospital Medical College, 1904; veteran of World War I; died Jan. 7, aged 79.

Pisani, Adolfo, New York City; Regia Universita di Napoli Facolta di Medicina e Chirurgia, Italy, 1894; served on the staff of the Columbus Hospital; died in the Italian Hospital Feb. 14, aged 86.

Plant, Joseph Henry Ⓜ Los Gatos, Calif.; Indiana Medical College, School of Medicine of Purdue University, Indianapolis, 1906; retired from the Veterans Administration Oct. 1, 1952; veteran of World War I; died in the Veterans Administration Hospital, Oakland, Feb. 6, aged 76.

Rath, Frieda, Elmhurst, N. Y.; Ludwig-Maximilians-Universität Medizinische Fakultät, München, Bavaria, Germany, 1933; died Dec. 27, aged 50.

Ranck, John Milton Ⓜ Leola, Pa.; Jefferson Medical College of Philadelphia, 1928; a director of the Leola National Bank; died in the Lancaster (Pa.) General Hospital Feb. 4, aged 59.

Schottstaedt, Wilhelm Emil Richard Ⓜ Fresno, Calif.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1909; past-president of the Fresno County Medical Society; specialist certified by the American Board of Internal Medicine; fellow of the American College of Physicians; for two terms president of the city board of education; served as a director of the Fresno County Red Cross Chapter and the Fresno County Tuberculosis Association; on the staffs of the Fresno County General Hospital and St. Agnes Hospital and the board of directors of the Fresno Community Hospital; died Jan. 27, aged 74.

Scott, Raymond Robert Ⓜ Selma, Calif.; Stanford University School of Medicine, San Francisco, 1926; fellow of the American College of Surgeons; veteran of World War II; associated with the Selma Community Hospital; died Dec. 1, aged 59.

Scroggs, William Paxton, Portland, Ore.; St. Louis University School of Medicine, 1908; veteran of World War I; died Dec. 20, aged 76.

Stanford, James Butt Ⓜ Dania, Fla.; born Dec. 17, 1886; College of Physicians and Surgeons, Memphis, Tenn., 1909; specialist certified by the American Board of Ophthalmology; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; served overseas during World War I; past-president of the Tennessee State Medical Association and the Memphis (Tenn.) and Shelby County Medical Society; formerly practiced in Memphis, Tenn., where he was on the staffs of the Memphis Eye, Ear, Nose and Throat, Baptist Memorial, Methodist, and St. Joseph hospitals; died Jan. 29, aged 72.

Steierman, Charles S. Ⓜ Far Rockaway, N. Y.; Boston University School of Medicine, 1924; associated with St. Joseph's Hospital, where he died Dec. 4, aged 61.

Steuer, David B., Shaker Heights, Ohio; Western Reserve University Medical Department, Cleveland, 1895; also a graduate in pharmacy; formerly city council president; practiced in Cleveland, where he was associated with Mount Sinai Hospital; past-president of the Cleveland Pharmaceutical Association; died Jan. 30, aged 93.

Strader, Simon Ernest, Los Angeles; University of Oklahoma School of Medicine, Oklahoma City, 1917; veteran of World War II; died in the Wadsworth Veterans Administration Hospital Nov. 30, aged 64.

Sullivan, James Albert, St. Louis; St. Louis College of Physicians and Surgeons, 1908; veteran of World War I; died in Hillsboro, Mo., Dec. 21, aged 74.

Thomas, Efton Jewel Ⓜ Miami Beach, Fla.; Northwestern University Medical School, Chicago, 1937; member of the American College of Chest Physicians; served a residency at the Dade County Hospital in Miami; veteran of World War II and was awarded five battle stars during his period of service in France and Germany; on the staff of the James M. Jackson Memorial Hospital in Miami, where he served an internship; affiliated with St. Francis Hospital; died in the Veterans Administration Hospital in Coral Gables, Fla., Feb. 4, aged 46.

Vawter, Fred Loomis, Berryville, Ark.; St. Louis College of Physicians and Surgeons, 1895; died Jan. 11, aged 89.

Wechsler, David, Rego Park, N. Y.; University and Bellevue Hospital Medical College, New York City, 1907; associated with Boulevard Hospital in Astoria and the Physicians Hospital in Jackson Heights, where he died Jan. 11, aged 75.

Wentworth, Harry Wilder, College Place, Wash.; Jefferson Medical College of Philadelphia, 1896; served on the staff of the Nampa State School in Nampa, Idaho; died Jan. 5, aged 89.

Whelchel, Alvin John Ⓜ Cordele, Ga.; Atlanta College of Physicians and Surgeons, 1905; past-president of the Crisp County Medical Society; on the staff of the Crisp County Hospital, where he died Dec. 15, aged 79.

White, J. M., Okmulgee, Okla.; Leonard Medical School, Raleigh, N. C., 1902; died Jan. 24, aged 88.

White, LeMoyne Ⓜ Boston; Harvard Medical School, Boston, 1940; on the staff of the Massachusetts General Hospital, where he served an internship and a residency; certified by the National Board of Medical Examiners; veteran of World War II; member of the American Psychiatric Association; died in the Peter Bent Brigham Hospital Dec. 9, aged 44.

Wilhoit, Fred L., Fort Lauderdale, Fla.; Kentucky University Medical Department, Louisville, 1902; served on the faculty of the University of Louisville (Ky.) School of Medicine; for many years practiced in Louisville, Ky.; died in Fort Lauderdale Beach Hospital Dec. 30, aged 82.

Williams, Lehman William Ⓜ Savannah, Ga.; University of Maryland School of Medicine, Baltimore, 1909; member of the Southeastern Surgical Congress; veteran of World War I; past-president of the Lions Club; died in the Warren A. Candler Hospital Jan. 28, aged 71.

Young, Leslie Winters Ⓜ Fairfield, Ill.; St. Louis University School of Medicine, 1927; member of the American Academy of General Practice; veteran of World War II; past-president of the Wayne County Medical Society; member of the board of health of Fairfield; associated with the Fairfield Memorial Hospital; director of the Fairfield National Bank; died in Port-au-Prince, Haiti Jan. 24, aged 58.

FOREIGN LETTERS

AUSTRIA

C-Reactive Protein.—At the meeting of the Society of Physicians in Vienna on Feb. 13, Dr. G. Geyer used a rabbit antiserum to precipitate the so-called C-reactive protein (CRP). In agreement with reports in the literature the CRP was observed in the serum obtained from patients who had a high fever, inflammatory and necrotizing processes, or malignant tumors. Its occurrence has been interpreted as a reaction of the plasma-protein system to nonspecific noxa. Consequently, the significance of the CRP for diagnosis is similar to that of the sedimentation rate. CRP was not found in the serum of patients with paraproteinemia, plasmacytoma, and reticulosis, in whom the sedimentation rate was greatly increased. CRP determinations were found useful in evaluating the activity of rheumatic fever. Cortisone causes the rapid disappearance of CRP.

UNITED KINGDOM

Soft Drinks.—New regulations governing the composition, labeling, and advertising of soft drinks are recommended by the Food Standards Committee of the Ministry of Agriculture, Fisheries, and Food. The makers of saccharin strenuously oppose them. They say that replacement of saccharin with sugar would cost up to 8 million dollars and might mean an increase in cost of a penny on a bottle of ready-to-serve and twopence on a bottle of concentrated soft drink. The main recommendations are that all soft drinks containing fruit juice should bear a label stating the percentage of fruit juice in the drink; the use of saccharin should be prohibited except for diabetic drinks, and sugar used instead; the term "glucose" should be forbidden in the labeling and advertising of soft drinks, as well as any form of testimonial or nutritional claim based on the carbohydrate content; and the use of acids for acidifying and flavoring purposes should be restricted and the addition of ascorbic acid allowed, to restore the natural vitamin content, in drinks containing fruit juice.

Student Suicides.—An editorial in the *British Medical Journal* of March 7 comments on a paper published by Sir Alan Rook, from the department of human ecology, Cambridge University, in the same issue. Owing to the complexity of the troubles that lead people to commit suicide, and to the fact that they can usually be investigated only in retrospect, too little is known to take effective preventive action as often as is desirable. This is particularly true of suicides among university students. No apparent difference exists in the incidence of suicide at Cambridge between the decades 1928-1938 and 1948-1958, although a higher rate was found during the intervening 10 years, which included World War II. Student mortality as a whole can be summarized by saying that, of 103 undergraduate deaths in 35 years, 41 were due to accident, 35 to suicide, and only 27 to disease. The figures are similar to those at Oxford.

The combined suicide rate at seven other British universities is much lower than at Oxford and Cambridge, although it is still, so far as can be judged, about twice that for nonuniversity men of similar age in England and Wales. Suicide rates for women students are generally low. Rook showed that few of the ready explanations for the high suicide rate have withstood scrutiny. Ill-fated love affairs, shortage of money, inadequate intelligence, moral perplexity, and the strain of social adjustment that poorer students sometimes experience on arrival at the university have been blamed. No doubt all have figured in individual case histories, but none so far has appeared in more than a small proportion of cases. Among students who become mental patients disharmony between parents and disturbance of relations between the student and members of his family occur oftener than among controls, but M. A. Davidson and co-workers pointed out that over 50% of patients break down in spite of good relationships, and 20% of controls have had similar experiences without breaking down.

Clearly recognizable factors include work difficulties, with the added stress of examinations. Such difficulties may arise from badly organized plans for work, laziness, excessive outside interests, choice of wrong course, illness, or emotional upsets. All experienced counselors know how common is the student who, with an unrealistically high level of aspiration, is encouraged by parental or other pressures to reach for perfection and to regard as failure anything less than first-class honors. The formal diagnosis of depression covers many such situations, not only where reasons for reactive depression are assumed to be the cause but also where absence of any obvious cause earns it the epithet endogenous. Another common factor is the difficulty of finding a

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The items in these letters are contributed by regular correspondents in the various foreign countries.

socially acceptable solution to the need for sexual expression. Homosexuality is possibly more commonly associated with suicide than the one case reported from Cambridge might suggest.

Getting Married.—The British Medical Association has stopped issuing its booklet "Getting Married." Dr. Winifred de Kok, who edited the booklet, resigned from the BMA in protest against this action, and so has the author of one of its frankest contributions, Dr. Eustace Chesser. In the booklet Dr. Chesser, a psychologist, discussed whether chastity was outmoded. The BMA action followed condemnation of the publication by physicians and the resignation of several from the association in protest at its contents. Thousands of copies of the booklet on sale throughout the country will not be withdrawn. Of the 250,000 copies printed 200,000 had been issued. The BMA is thus left with 50,000 copies on its hands. These may be released later by the Council.

"All we did," said Dr. de Kok, "was to state the facts given in statistics. We wanted to help all young people, instead of only the good ones." She said she was angry and disgusted by the BMA's action. Dr. Chesser said: "I am amazed that the BMA should have done this. I am at a loss to understand it. Psychologically, I cannot see how the booklet could be harmful to anyone. I feel strongly that medical men, indeed everyone, should have the right to express their views, even though they are not majority views. I fully respect religious views in this matter but the BMA should not have acted on the complaints of a few doctors." Discussing the booklet the *Church Times* says: "There must be many Christian doctors who will loathe and abominate the whole thing. If the BMA wishes to convince the country that there is no longer any connection between medical and Christian morality, it is certainly going the right way about it."

State Scheme for Chiropody.—Chiropody is to be added to the healing facilities available under the National Health Service. Mr. Walker-Smith, Minister of Health, said that he was now ready to approve proposals by local health authorities who wished to provide a chiropody service. Local health authorities will be requested to give priority to the elderly, the physically handicapped, and expectant mothers in the early years of the new service.

Increasing Fertility.—According to a report published by the General Register Office (Fertility Report, Her Majesty's Stationery Office, 1959) the fertility of Britain is increasing. In 1934 the average size of the family had fallen from six, the figure in the 1870's, to two children. With the start of World War II in 1939 there was a steep decline. By 1942 the rate was rising again, and by 1947 the birth rate was at its postwar peak. Since 1952 the fertility rate has been fairly stable. The report reveals that there are about 7,500,000 married women in England and Wales under the age of 50. Among all married women under 50 about 22% are childless, 30% have had one child, 26% two, 12% three, and 10% four or more children. The largest families are found among unskilled workers, where the average size of the family is 2.64 children. The smallest families are those of white collar workers, with 1.49 children, and the professional and managerial class, with 1.51. The area of highest fertility is in Merseyside, near Liverpool, followed by the north of England and north Wales.

Poliomyelitis Vaccine.—A fourth or booster dose of poliomyelitis vaccine for adolescents and adults was recommended by a group of Medical Research Council workers (*Brit. M. J.* 1:609, 1959). This has already been investigated in young children, and the favorable results obtained in this group have now been confirmed in those of older age groups. A booster dose of vaccine was given to 111 adolescents and adults drawn from a population of medical students, research workers, and boys from Epsom College, near London. This was given 6 to 12 months after primary immunization had produced a good response to poliovirus types 2 and 3. All but four of the subjects still had detectable antibody induced by their initial course of vaccination, but with type 1 about a third of those immunized had lost their antibody, and these responded poorly compared with those in whom it was still present. In those who responded poorly to type 1 a fourth dose of vaccine produced a booster response to this type. The MRC workers stated that it was probable that in the age groups studied at least a threefold increase in the amount of type 1 antigen in poliomyelitis vaccine would be necessary to give satisfactory antibody responses after three doses in all subjects.

Budgerigars and Poliomyelitis.—A year ago Sommerville reported that a budgerigar which had nipped the lip of a boy who later died from poliomyelitis had carried poliovirus type 1. He now reports that attempts to infect other budgerigars with the virus were unsuccessful, although the birds became ill between 15 and 21 days after inoculation (*Lancet* 1:495, 1959). A postal survey of 224 families in which there had been a known case of poliomyelitis revealed that 56 kept pet budgerigars and that in 17 instances the birds died at about the same time as a child in the house contracted paralytic or nonparalytic poliomyelitis.

Dick and co-workers of Belfast also investigated the possibility that budgerigars may carry and transmit poliovirus (*Lancet* 1:497, 1959). They found that the birds were resistant to infection with 11 strains given by the oral and intracerebral routes. Poliovirus neutralizing antibody was absent from the blood of 50 budgerigars, and birds were never found with residual paralysis. It was therefore concluded that they do not often become infected with or paralyzed by polioviruses and that they are unlikely to be of importance in the spread of the disease. This does not rule out the possibility that budgerigars may occasionally become infected by people excreting poliovirus and then later transmit the virus to other human contacts. The results of an inquiry into the illness of budgerigars in the household of patients suffering from poliomyelitis yielded surprising results. Of 30 patients who kept budgerigars 3 reported the death of at least one bird within two weeks of the onset of their illness. The authors considered that this was sufficiently suggestive to warrant continued search for an association between human poliomyelitis and poliovirus infection in budgerigars.

Advance in Cardiac Surgery.—An editorial in the *British Medical Journal* of Feb. 28 comments on an operation which was performed by a team under the direction of C. E. Drew in Westminster Hospital on a child, aged 4, who underwent successful repair of ventricular and atrial septal defects, with complete circulatory bypass for 45 minutes. Postoperative recovery was uncomplicated. By incorporating a new technique for cannulating the pulmonary artery, the patient's lungs were used to oxygenate the blood, thus eliminating the machine-oxygenator, which is the main source of serious complications. By means of the purely cardiac bypass so produced it was possible to induce deep hypothermia—below 15 C (59 F)—by extracorporeal cooling of blood flowing from the left atrium. At this low temperature it was possible to shut off completely all circulatory flow during the actual repair of the intracardiac defect. Technical details of the development of the method in dogs were given by G. Keen.

The left femoral artery was exposed, then, after thoracotomy and the administration of heparin, catheters were inserted into the right and left atria and a cannula was placed in the left femoral artery. About 25% of the left arterial flow was drained into a well, pumped through a heat exchanger at 2 to 4 C, and returned to the left femoral artery. The body temperature dropped rapidly. When about 25 C (77 F) was reached the cardiac action became impaired and the circulation fell markedly. At this point a small stab wound was made in the upper part of the right ventricle and a catheter was introduced through the pulmonary valve into the pulmonary artery. The right atrial flow (the whole venous return) was then allowed to drain into a second well, whence it was pumped through the lungs via the pulmonary arterial cannula. The left-sided bypass was fully opened and the rate of the pump was increased. Cooling continued until the body temperature was below 15 C (59 F). The pumps were then turned off and artificial respiration discontinued. The venae cavae were closed by tapes, and the heart was drained. Cardiotomy was then performed and the intracardiac defect repaired. On completion of this the action of the heat exchanger was reversed to warm the blood until normal body temperature was approached.

Germ Warfare.—In February Dr. Barnet Stross asked the Secretary of State for Foreign Affairs to arrange a conference of the great powers to discuss the abolition of stocks of toxins, viruses, and chemicals that might be used in warfare, and the cessation of their manufacture. Mr. Robert Allan, Under Secretary of the Foreign Office, agreed that it would be highly desirable to eliminate this threat, but believed that an agreement to stop making tests of nuclear weapons should be accomplished first. He also told Dr. Stross that the existing international agreements having a bearing on bacteriological or chemical warfare that were enforceable in the United Kingdom were those of the Geneva Protocol of 1925 and the Hague Convention of 1907. Mr. J. Stonehouse asked the Minister of Defense what supplies of botulin were available in this country as part of the defense program and what scientists he had appointed to advise him on the use of this weapon. Mr. Sandys replied that Britain was not developing any such weapon.

Early Operation to Be Telecast.—The question of broadcasting a warning for the benefit of squeamish viewers before a television program about leg amputation in 1846 was considered by the BBC. The program is a documentary entitled "They Made History." A BBC spokesman did not think such a warning would be necessary, as the actual severing of the leg would not be shown, but a short explanatory statement was to be made at the beginning of the program. The scene was to be reconstructed exactly as it was on the afternoon of Monday, Dec. 21, 1846, in the University College Hospital, London, when Robert Liston became the first surgeon in Europe to use ether as an anesthetic. The somewhat primitive operating room was recreated from contemporary descriptions and old photographs. Replicas of apparatus and equipment were specially made for the production from drawings and descriptions in medical journals. An exact copy, complete with straps and straw mattress, of the actual operating table kept in the University College Museum was made, and genuine mid-19th-century surgical instruments were obtained on loan.

CORRESPONDENCE

THERAPY IN BRONCHIAL ASTHMA

To the Editor:—The article entitled "Current Status of Bronchial Asthma," by Segal, in The Journal, March 7, 1959, pages 1063-1071, appears as an authorized publication of the Council on Drugs. Surely such an article must, by inference, contain a distillation of the country's best thinking on the subject. A real responsibility is implied here, because the uncritical reader has no choice but to accept the contents dogmatically. The article does not meet this responsibility. The fundamental fault with this, as with many similar articles not quite as authenticated, is the complexity which they endow on the symptomatic treatment of bronchial asthma. I submit that the principles of treatment are simple and that the real talent lies in discontinuing therapy with numerous and often harmful medicaments and resisting the dangerous temptation to sedate the seriously ill asthmatic patient.

The most fundamental principle in the treatment of bronchial asthma is hydration. The cardinal cause of status asthmaticus is dehydration producing tenacious mucous plugs which can only be removed by fluids in large quantities—orally given in the average asthmatic and intravenously given in the case of status asthmaticus. If the average physician could be impressed with this single fact, the treatment of asthma would be enormously improved. This point is substantially ignored in the article.

I am disturbed also over the rather permissive attitude towards sedatives, especially meperidine (Demerol) hydrochloride. This drug is no different from other opiates in the euphoria it produces and the consequent indifference to cough stimuli. Failure to cough is serious, sometimes fatal, in the asthmatic because of the retained secretions, and I am one of many who have seen a fatal issue laid at the door of meperidine.

I strongly disagree with Dr. Segal, who believes that the "search for the responsible agents is difficult and often completely unsuccessful." He speaks as a specialist in chest disease and is concerned with the lungs. As an allergist I can state with confidence that the responsible agents are usually found when one assesses the total allergic patient and that etiological treatment based on such agents is still the most successful form of treatment known.

Ralph Bookman, M.D.
240 S. La Cienega Blvd.
Beverly Hills, Calif.

To the Editor:—The pertinent questions raised by Dr. Bookman concern hydration, use of meperidine, and the role of the allergist. The introductory remarks in the article, which was reduced in size because of limitations of space, referred to the effects of dehydration in the patient with intractable bronchial asthma. The discussion of the intravenous use of aminophylline described the continuous infusion technique with three liters per 24 hours of a solution of 5% dextrose in water with aminophylline for the hospitalized patient with intractable asthma. This therapy is designed to correct dehydration, supply needed dextrose, and administer aminophylline for bronchodilation. Patients who are receiving iodides are generally urged to take them with 8 to 10 oz. of water or a preferred beverage. I have always used a teaching aphorism that "the value of iodides in the patient with chronic bronchial asthma is proportionately increased by his fluid intake." Patients receiving oral steroids should empirically take 8 to 12 oz. of orange or cranberry juice daily for supplemental potassium and fluid replacement. Correction of dehydration is indeed a very important factor of therapy.

There is a specific place for the use of meperidine in the patient with a severe acute attack or in status asthmaticus when the usual methods of treatment have failed. The value, limitations, and hazards of meperidine usage were clearly stated in the article. In the laboratory we have observed improvement in timed vital capacity and in pressure-flow rate relationships with reduction in the work of breathing in patients with chronic bronchial asthma. In acute studies with patients with the carbon dioxide retention syndrome (severe chronic pulmonary emphysema), we did not observe respiratory depression, increase in arterial carbon dioxide level, or drop in pH. I do not believe that the hazards involved with the judicious use of meperidine are any greater than with the use of a host of other drugs.

Finally, under my discussion of medical management, I stated the importance of allergic factors and the need for specific allergic therapy whenever possible. I believe that it is the opinion of most conservative, competent, and teaching allergists that because the search for responsible agents is frequently difficult and often completely unsuccessful, emphasis on the allergic approach to management should not exclude physiological therapy. A rational, combined approach brings the best results.

Maurice S. Segal, M.D.
818 Harrison Ave.
Boston 18.

MEDICOLEGAL ABSTRACTS

Libel and Slander: Qualified Privilege for Director of Nurses.—This was an action for libel by a private-duty nurse against the defendant hospital and its director of nurses. From a judgment in favor of the defendant the plaintiff appealed to the appellate court of Illinois.

The plaintiff, a registered nurse, was intermittently engaged as a private-duty nurse by various patients of the defendant hospital during the period from August, 1955, through June, 1956. She was a member of the Nurses' Professional Registry. During this period the defendant was the director of nurses at the hospital and was charged with the supervision of all nursing care, including that of private-duty nurses, administered to patients in the hospital. On three different occasions during the months of April and May, 1956, the defendant received reports of narcotics losses from the hospital pharmacist, each report indicating the loss of one 30-cc. vial of Demerol hydrochloride, a narcotic. After the third such report she started checking into the records of the nurses who had been on duty on the floor where the losses occurred. In checking the records of the plaintiff it was found that, on 22 or 23 prior instances, the plaintiff had failed properly to record the administration to patients of narcotics which, from the narcotics record, she had withdrawn from the supply on the floor. On three specific instances it appeared that the plaintiff had failed to record administering Demerol to a patient after having withdrawn the drug from the narcotics cabinet. Normal hospital operating procedures required that the nurse record on the narcotics record the withdrawal of any narcotic, and then record on the individual patient's record, or nurse's record, the administration thereof to the patient. Accurate records and a perpetual inventory of narcotics and the handling thereof are obviously necessary for many reasons, including the doctor's information, the patient's welfare, charting the patient, and inspection by the Federal Bureau of Narcotics. The plaintiff was an experienced nurse and knew the normal operating procedures. The defendant talked to the plaintiff and called some of the above derelictions to the plaintiff's attention, directing that henceforth she should not go into the narcotics cabinet unless another nurse was present.

When the case on which the plaintiff was then working terminated, the defendant called the Nurses' Professional Registry and asked that the plaintiff not be assigned as a private-duty nurse to the defendant hospital in the future. A few days later the Grievance Committee of the registry asked the defendant to put her request in a letter, which she did. This letter is the basis of the present case for libel. The letter stated, in part, that the defendant preferred in the future that the plaintiff not be sent on cases at the defendant hospital. Over a period of the past three months, the letter continued, three vials of Demerol had disappeared from the locked medicine cabinet on the floor where the plaintiff was on duty. In two instances the loss occurred on the 3 to 11 p. m. shift while she was on duty, and the other loss occurred on the 7 a. m. to 3 p. m. shift when she had changed shifts for a few days. Two incidents had occurred the previous winter when the plaintiff charted another medication on her patient's chart but was observed to have taken Demerol. The letter continued that the defendant had talked to the plaintiff about this loss of Demerol and felt that she had a most unusual and abnormal reaction. The letter also stated that the present request in no way reflected on the care given by the plaintiff to patients in the defendant hospital.

This letter was referred by the Nurses' Registry to the Grievance Committee of the Private Duty Section. Copies of the letter were sent to the members of that committee and to the plaintiff, but to no other person.

A privileged communication, said the appellate court, is one which, except for the occasion on which or the circumstances under which it is made, might be defamatory and actionable. We believe under the circumstances that the letter in question was written on a privileged occasion and is qualifiedly or conditionally privileged. Where circumstances exist, or are reasonably believed by the defendant to exist, from which he has an interest or duty, or in good faith believes he has an interest or duty, to make a certain communication to another person having a corresponding interest or duty, and the defendant is so situated that he believes it the discharge of his interest or duty or in the interests of society that he should make the communication, and if he makes the communication in good faith, under those circumstances, believing the communication to be true, even though it may not be true, then the communication is qualifiedly or conditionally privileged, even though the defendant's interest or duty be not necessarily a legal one but only moral or social and imperfect in character. The essential elements are good faith by the defendant, an interest or duty to be upheld, a statement limited in its scope to that purpose, a proper occasion, and publication in a proper manner and to proper parties only. In the absence of actual malice a communication may be qualifiedly privileged, if the other essential elements are present, even though it is not true, and even though it charges a crime;

but a communication loses its character as privileged and is actionable upon proof of actual malice. Both the person by whom and the person to whom the communication is made must have an interest or duty in respect to the matter in order to render it a qualifiedly or conditionally privileged communication. It is clearly settled that a communication respecting the charter of an employee or former employee is qualifiedly privileged if made in good faith by a person having an interest or duty in the premises.

Is the letter itself sufficient competent evidence tending to show actual malice? We think not, said the court. The plaintiff urges that the letter imputes to her the commission of a crime—stealing Demerol from the hospital. We believe it will not fairly bear that construction. It does not say that. "Disappear" does not mean stolen. "Taken" does not mean stolen. And the last paragraph of the letter, stating that this in no way reflects on the care the plaintiff has given patients, is a fair expression of good will, not ill will, and at least is hardly the thing to be expected from a defendant motivated by malice.

There being no competent evidence in the facts and circumstances exclusive of the letter itself, or in the letter itself, tending to show malice, the court of appeals held that the trial court did not err in allowing the defendant's motion for a directed verdict. The judgment for the defendant was, therefore, affirmed. *Judge v. Rockford Memorial Hospital,* 150 N. E. (2) 202 (Ill., 1958).

Governmental Hospitals: Denial of Surgical Privileges.—This was an action for a declaratory judgment to the effect that the plaintiff was entitled to major surgical privileges at the Jackson Memorial Hospital, Miami, Fla. From a judgment in favor of the plaintiff the defendant appealed to the district court of appeals of Florida.

The plaintiff, a licensed physician practicing in Dade County, Florida, applied for major surgical privileges at the Jackson Memorial Hospital in 1952 and again in 1955, but both applications were denied on the ground that he had failed to meet the qualifications and standards set up by the hospital's medical board. The plaintiff contended that such denials were arbitrary, capricious, unlawful, and discriminatory.

Jackson Memorial Hospital is owned and operated by Dade County and the Board of County Commissioners through a medical board responsible to the county commissioners. The hospital is supported by both public funds and paying patients. The bylaws of the medical staff set forth nine requirements for the appointment of a physician to the medical staff, and the defendants contended that the plaintiff did not meet the following requirements: "4. He must be a graduate of an approved medical school. 5. He must have had an internship of at least one year in a hospital approved by the Medical Board. . . . 8. He must be competent in the line of work he proposes to do."

The first question raised on appeal was whether or not a hospital supported by public funds may require of a physician, as a condition to the use of its facilities for major surgery, standards higher than those required by the state for a medical license. In his brief the plaintiff conceded that a public hospital may require higher standards for major surgery than are required for a medical license, but he contended that such rule was not applicable to him. He urged that since the hospital was supported by public funds it could not arbitrarily exclude a licensed physician from the use of such hospital facilities for the physician's own private practice. The court said that the law is well settled that a municipality may regulate and control the operation of a hospital provided by it and that, in the exercise of such power, it may exclude those not shown to have met its requirements. Furthermore, it is not incumbent upon the city to maintain a hospital for the private practice of medicine, nor does a physician have a constitutional or statutory right to practice his profession in the city's hospital. Even though the hospital be a public hospital, the plaintiff as a physician had no right per se to practice in the hospital, it being a privilege rather than a right. In this case, concluded the court, there was no showing that the conditions or requirements laid down by the medical staff for the admission of a physician to staff privileges or for major surgical privileges are unreasonable, discriminatory, or arbitrary, or that they have been so applied to the plaintiff.

The second question urged error in rulings on the facts. The testimony showed that the plaintiff had received a medical degree from a college which had never been accredited and which closed three years after his graduation. Secondly, the testimony showed that the plaintiff interned in a hospital which was not accredited for the purpose of an internship program. Lastly, the testimony disclosed that the surgical experience and skill of the plaintiff fell short of convincing either friends or casual acquaintances that he possessed the requisite qualifications for the exercise of major surgical privileges.

It was the burden of the plaintiff to prove by a preponderance of the evidence that he qualified under the requirements set out and that such requirements were being arbitrarily and discriminatorily applied to him. This, concluded the court, the plaintiff failed to do. The judgment in favor of the plaintiff was, therefore, reversed. *Dade County v. Trombly,* 102 So. (2) 394 (Fla., 1958).

THE LEISURE CORNER

CERAMICS

The making of ceramics is one of the oldest occupations in the world. Ceramic articles dating from as long ago as the Stone Age, 10 to 20 thousand years ago, have been found, and some of them are still in good condition. The crude Indian bowls of North America, the funeral urns of prehistoric China, and the attractive votive goblets of Egypt are among the many historic pieces archeologists have unearthed. In modern times the advance of scientific knowledge has led to new ceramic products and new methods of manufacture.

The word ceramics is derived from the Greek *keramikos*, meaning potter's clay. In a more technical sense ceramics includes all objects, used for practical or ornamental purposes, which are made from clay or mixtures of clay and other substances and baked or fired to hardness; porcelain, earthenware, stoneware, and terra cotta are types of ceramics. The art is determined by the basic charateristics of clay. Clay is plastic; it can be molded or modeled when it is moist. It retains its form when dry, and it becomes rock-hard when exposed to very high temperatures. After it is thoroughly dried or baked it is among the most durable of substances. Clay consists of silica, alumina, and water in chemical combination. Other chemicals, mainly earth oxides, are found in clay and determine its color, plasticity, firing properties, and economic utility.

Modeling by hand is one way of working with clay, hand pressing is another, and a third involves use of the potter's wheel. The basic sequence of steps in making a ceramic article is as follows: (1) constructing the object while the clay is moist; (2) drying the object; (3) first firing; (4) applying the glaze, or underglaze color and glaze; (5) second firing; (6) applying the overglaze color on the glazed object; and (7) applying the overglaze to the object for the third and final firing.

Making small ceramic articles that can be held in the hand appeals to most beginners. Take a chunk of clay, cut it in two against a wire, pound it against a board to release all the air bubbles, and the first step toward creation is taken. A great deal of patience is required to learn how to make pottery. After you have made the model out of clay, having finished it to your own satisfaction, the article must stand for several days until it is thoroughly dry and prepared for firing. After baking and cooling the ceramic object appears dull and a little rough. It must be painted with a glaze before the second firing. Each ingredient of the glaze powder should be measured with care. After this is done the powders are ground with mortar and pestle for about 20 minutes and run through a sieve to remove any lumps, water is added until the mixture is moist, and 4 tablespoons of gum is added. The glaze is then applied to the clay model with a brush.

The story of glazing is itself interesting. The technique of glazing tiles was known in Egypt as long ago as 5500 B. C. In the 18th dynasty, some time between 1540 and 1350 B. C., magnificent glaze colors were in use, notably purple, violet, red, orange, yellow, green, and an almost pure white. These colors were painted on vases and other types of pottery, which remain some of the finest pieces of ceramic art known to man. At present, the introduction of glazes with novel coloring combinations and unprecedented tactile effects occupies the attention and efforts of many ceramic artists, chemists, and engineers. Industrial glazes are applied by dipping, pouring, spraying, or painting. An unfired glaze, when moist, is usually off-gray; consequently, the ceramic hobbist should be aware that in order to establish the appearance presented after the piece is matured in the kiln the glaze must be fired in advance.

The use of the potter's wheel is an ancient technique. The first potter's wheels were probably crude balanced stones, rotated by hand. Various types have been introduced in different countries. The kick wheel is the oldest and simplest form in use today; the seated operator kicks a fly wheel with his foot while manipulating the clay on the throwing head with his hands. The electrically operated wheel, used by professional workers who must turn out a large volume of merchandise, represents a great advance in ceramics. Electric wheels have various attachments for catching clay drippings, for providing water, and for hand rests. The numerous ceramic articles made industrially today play an important role in modern life. Some of these articles, such as fine china, are luxuries, but others, such as firebrick, sewer pipe, and enamel for refrigerators and kitchen utensils, are necessities.

Many doctors enjoy creating ceramic objects as a hobby. Persons who have a definite feeling for clay and an ability to express themselves imaginatively in plastic forms can derive pleasure not only from creating a brand-new ceramic design or making many reproductions of models but also from presenting these as highly personalized gifts to friends and associates. The amateur devotee of ceramics will find that the more he learns about this art the more fascinating he finds it to be. The doctor interested in ceramics discovers that there is "life" in clay and that it can play strange tricks under the influence of "fire." The behavior of color is as capricious as that of human beings. There is no end to the number of articles that can be made for home, office, and personal adornment. Once started, the ceramic hobbyist can find an endless variety of things to create. The most mundane object can be converted to a thing of beauty. Ceramics answers not only the need for self [illegible] also the problem of what to give friends everything.

MEDICAL LITERATURE ABSTRACTS

INTERNAL MEDICINE

Functional Colopathy or Irritable Colon with Special Reference to Treatment. E. Gripwall. Nord. med. 61:55-57 (Jan. 8) 1959 (In Swedish) [Stockholm].

During the past year a thorough test of Belladenal Retard, a new sustained-action antispasmodic, was carried out in the medical department of Södertälje Hospital in 35 patients with history of variable psychosomatic disorders of the digestive canal for many years. There were 28 cases of typical irritable colon syndrome, 1 case of duodenal ulcer, 2 cases of gastritis, 1 case of cholelithiasis, and 2 cases of colitis. Most of the patients had previously been treated with the usual antispasmodics. Treatment with Belladenal Retard was given from 1 to 9 months. The side-effects were slight. Approved dietary and hygienic measures were prescribed at the same time. At the end of treatment 17 patients were completely free from symptoms and 15 were improved; 1 patient showed negligible improvement and 2 no improvement. In some cases the improvement continued after withdrawal of the medication.

Systemic Lupus Erythematosus Responding to Chloramphenicol. R. Wells. M. J. Malaya 13:165-170 (Dec.) 1958 [Singapore].

The 2 patients presented were observed in the department of medicine of the General Hospital in Singapore. One was a 30-year-old Chinese housewife, the other a 41-year-old Chinese clerk. The essential complaint was fever of unknown etiology, and examinations of the sternal marrow at the time of admission showed abnormal myelocytes with eccentric nuclei and central zones of pink-staining cytoplasm. These first suggested the diagnosis of disseminated lupus erythematosus, but in the absence of any typical L. E. cells it was not thought justified to treat the patients on that basis. Treatment with chloramphenicol was instituted in the first patient on the basis of an indefinite diagnosis of atypical typhoid. This patient experienced 2 remissions on chloramphenicol therapy. The second patient had one similar remission on chloramphenicol, and it is difficult to believe that the 3 remissions were fortuitous. Investigation failed to show any evidence of concomitant bacterial infections which might have explained the responses to an antibiotic, and it is felt that in both patients the diagnosis of lupus erythematosus explains their illnesses.

When L. E. cells were finally found in the first patient, she was first given cortisone, but later prednisolone was found to be more effective. When the second patient, who had remained well for 3 months after his chloramphenicol-induced remission, was readmitted, he had a typical lupus erythematosus "butterfly" rash over his nose and cheeks and was found to have L. E. cells in his bone marrow and peripheral blood. He responded quickly to prednisolone therapy and has since had no further relapses.

Since observing the atypical myelocytes in these 2 patients, the diagnosis of lupus erythematosus in 2 further cases was first suspected by the chance finding of atypical myelocytes in bone marrow preparations, and in both cases the diagnosis was later proved to be correct. It is possible that the appearance of these atypical myelocytes in the bone marrow in lupus erythematosus may be of diagnostic value at an earlier stage of the disease before the development of typical L. E. cells. Microscopic appearances suggest that these atypical myelocytes do not develop as a result of phagocytosis of erythrocytes and do not represent the typical L. E. phenomenon in myelocytes.

Peptic Ulcer in the Elderly. A. I. Friedman. Am. J. Gastroenterology. 31:15-22 (Jan.) 1959 [New York].

In the 62 patients, over 60 years of age, who received hospital treatment during the years from 1953 to 1956, the diagnosis of peptic ulcer was confirmed by clinical, roentgenologic, and/or pathological evidence. The group included 44 patients with duodenal ulcer, 15 with gastric ulcer, 1 with multiple gastric and duodenal ulcers, and 2 with anastomotic ulcer. The last 2 patients were both men, and in one a recurrence developed after a gastroduodenostomy (Billroth I) and in the other after a gastrojejunostomy (Billroth II). In all, there were 46 men and 16 women. More than half of the patients apparently experienced their first symp-

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The place of publication of the periodicals appears in brackets preceding each abstract.

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toms of peptic ulceration after age 55. Complications were present in 39 of the patients, the most frequent being hemorrhage, which occurred in 29. Perforation occurred in 7, and obstruction in 3 of the patients. The fact that the sex ratio of duodenal to gastric ulcer approached unity in those with acute symptoms is an interesting feature of this age group.

Operations were performed on 10 patients—subtotal gastrectomy (5), gastroenterostomy with vagotomy (2), pyloroplasty (1), and simple closure of a perforation (2). One of the 10 patients died on the 6th day after operation, but, in addition to his bleeding duodenal ulcer, he also had the sequels of a cerebrovascular accident. Thirteen of the patients died while receiving medical treatment, most of them from hemorrhage or perforation. The author feels that this high mortality rate during medical treatment (25%) and the low mortality during elective surgery for ulcer justify a more liberal use of surgical therapy for the complications of peptic ulcer in elderly patients. The peptic ulcer patient over 50, who presents with hemorrhage or perforation, should be subjected to surgical treatment whenever conditions permit.

Bioassay of Urinary Catecholamines in Cases of Pheochromocytomas: Its Diagnostic Value as Compared with Clinical Signs, Roentgenologic Aspects, and Pharmacodynamic Data. L. De Gennes, H. Bricaire and J. Hazard. Presse méd. 67:83-87 (Jan. 17) 1959 (In French) [Paris].

The urinary excretion of catecholamines was studied by bioassay in patients with persistent arterial hypertension or with intermittent paroxysmal hypertension for the diagnosis of pheochromocytoma. The presence of such a tumor was particularly suspected in patients with fluctuations in blood pressure. Among 75 patients on whom the authors have been able to carry out several bioassays of urinary catecholamines, they found 6 cases of pheochromocytoma. Five were discovered at operation, and one at autopsy. In addition to these 6, there were 2 patients in whom the diagnosis was considered probable. The 8 cases are here described. The excretion of catecholamines in micrograms per day was estimated at 360, 1,350, 400, 2,400, 1,000, 180, 275, and 55. In the last 2 patients definitive diagnosis was impossible because no operation was done. The authors consider a daily urinary output of 50 to 55 mcg. of catecholamines normal.

The authors also applied a test with lyophilized Regitine Methanesulfonate, a potent adrenergic blocking agent, which blocks both epinephrine and the effects of sympathetic nerve stimulation. It is emphasized that the drug should be administered by the intravenous route in daily doses of 5 mg. in the adult, and it is effective only if no sedatives were given to the patient 24 hours before the test. A positive hypotensive response consists of a fall greater than 35 mm. H_2O systolic and 25 mm. H_2O diastolic in less than 2 minutes after the injection, and may be then considered theoretically as diagnostic of pheochromocytoma. The test is not dangerous and is easly done; the only side-effects observed were mild discomfort and transitory tachycardia.

Extraperitoneal pneumography combined with urography and tomography was performed on 36 patients, but despite improvements in technique and reading frequent mistakes were made by overestimating the size of the shadows. The clinical study and bioassays of these patients with pheochromocytomas showed that the demonstration of urinary catecholamines is a most reliable and informative diagnostic method which should be conjointly used with pharmacodynamic tests and extrapulmonary pneumography.

Behavior of C-Reactive Protein in Malignant Blood Diseases, with Special Regard to Hodgkin's Lymphogranuloma. V. Pecori, E. Turrisi, P. Altucci and G. Buonanno. Riforma med. 73:1-3 (Jan. 3) 1959 (In Italian) [Naples].

C-reactive protein tests were given to 31 patients, 5 with chronic myeloid leukemia, 3 with chronic lymphatic leukemia, 3 with acute histiocytic leukemia, 1 with lymphoblastic leukemia, 19 with malignant lymphogranuloma (Hodgkin's disease), and 1 with tuberculous lymphadenitis. The patients were between 15 and 55 years of age. The test was performed with a capillary tube, 90 cm. long and 0.4 mm. in diameter, which was filled to one-third of its capacity with C-antiserum and to one-third with the serum to be examined. The tube was then turned repeatedly to mix the 2 serums, and then one of the 2 openings of the tube was sealed with a flame. The first reading was taken after 2 hours of incubation at 37 C temperature; the second reading was taken 12 hours after the first reading, during which time the tube was placed in a refrigerator at 4 C temperature. A 1-mm. column of precipitate was called a 1+ and so on. No precipitation of C-antiserum occurred when serum from normal persons was used. The C-reactive protein test gave positive results in all patients with Hodgkin's disease, and the intensity varied between 3+ and 4+. Most of the patients with high C-reactive protein values presented also high erythrocyte sedimentation values and high diphenylamine reaction values. The 2 patients with Hodgkin's disease whose C-reactive protein test was less than 3+ were passing through at the time of the test a remission of the symptoms; they presented no fever, and the size of the lymph nodes had diminished markedly. High positivity was also noticed in patients with generalized lymphogranuloma. The highest positivity was noted in one patient with multiple lymph node localizations, marked hepatosplenomegaly, and metastases in the cerebrospinal system. Roentgen therapy in patients with localized forms of the disease caused a diminution in the intensity of the test. No therapy had any effect on the intensity of the test in patients with generalized lymphogranuloma. The C-reactive protein test gave positive results in patients with Hodgkin's disease in a very early stage. In some patients highly intensive positive values were obtained by giving the test 1 or 2 days after the occurrence of the first clinical symptoms of the disease. The results of the C-reactive protein test obtained in patients with malignant blood diseases other than Hodgkin's disease were not constant, and the authors found that the test was not of too great importance in such cases. The authors point out the value of the test as a means of determining the course of a specific blood disease. Remission of the symptoms always corresponded with a diminution in the positive values of the test.

SURGERY

Cardiovascular Surgery in a Children's Hospital: I. Acyanotic Lesions: A Review of 241 Operations. R. Ash, J. Johnson, C. E. Koop and others. J. Pediat. 54:133-142 (Feb.) 1959 [St. Louis].

Of 434 cardiovascular operations performed at the Children's Hospital of Philadelphia between 1947 and 1958, 241 were performed on 239 acyanotic children, 6 of whom died, representing an operative death rate of 2.5%. Of the 239 patients operated on, 160 had a patent ductus arteriosus with a continuous murmur. Ligation with 3 silk ligatures was used in 150 of these children. There was no operative death and not a single instance of recanalization of the patent ductus arteriosus. In 10 additional children with patent ductus arteriosus and with pulmonary hypertension, the diagnosis was made, in the absence of a continuous murmur, by an arteriogram in 4 and by cardiac catheterization in 6. There was one operative death, and one patient, in whom pulmonary hypertension persisted postoperatively, died 14 months after the operation. Twelve patients with vascular rings constricting the trachea and esophagus were operated on, with 3 deaths; 2 of the deaths occurred in newborn infants. Thirty-seven operations were performed for coarctation of the aorta, with one death. The authors believe that it is important to operate on patients with coarctation of the aorta during childhood when the arteries are pliable and an anastomosis can almost invariably be performed without the use of grafts. Thirteen patients with atrial septal defects were operated on, and 5 of these had anomalous venous drainage of right pulmonary veins in addition to their septal defects. The surgical intervention was performed under direct vision by means of hypothermia and circulatory occlusion, intermittent when necessary. There were no deaths, and the results were gratifying. Two boys with constrictive pericarditis were operated on, with good results. An arteriovenous fistula involving the left vertebral artery was resected in a 5-year-old boy in whom the site of the fistula had been verified preoperatively by angiocardiography.

Mitral Stenosis Treated by Mitral Commissurotomy: A Medical Review of Surgical Results. E. Gubbay and A. Vineberg. Canad. M. A. J. 80:168-173 (Feb. 1) 1959 [Toronto].

The authors report on 103 consecutive patients with mitral stenosis treated by mitral commissurotomy at the Royal Victoria Hospital in Montreal between 1954 and 1956. Ninety-five of the 103 patients were followed up for at least one year. Of the 95 patients, 67 had pure mitral stenosis, and 28 had mitral stenosis and regurgitation. Of the 67 patients, 39 obtained excellent results, 18 good results, 8 poor results, and 2 died. Of the 28 patients, 5 obtained excellent results, 13 good results, 6 poor results, and 4 died. Of the total number of 6 deaths, 2 were operative deaths, representing an operative mortality rate of 2%. The total number of 6 deaths is not prohibitive in view of the great benefits that may be conferred by the operation. The results obtained and a review of the literature lead to the following conclusions. The operative risk is small and could be reduced further if patients were operated on before they reach the late stages of huge size of the heart, immobile mitral valves, or incompletely controlled heart failure. The results are worth while, even in those with mitral regurgitation, provided that there is sufficient stenosis to relieve and the valve leaflets are mobile.

Segmental Resection for Pulmonary Tuberculosis: An Analysis of 335 Cases. V. O. Björk. J. Thoracic Surg. 37:135-147 (Feb.) 1959 [St. Louis].

The author reports on 335 patients, between the ages of 9 and 64 years, with pulmonary tuberculosis, who underwent segmental resection at the thoracic surgical clinic of the University Hospital in Uppsala, Sweden. The indications for segmental resection were tuberculous cavitation in 314 patients (94%), bronchiectasis with positive sputum in 5, bronchial stenosis in 2, tuberculous empyema with bronchial fistula in 2, and tuberculoma in 12. There were 5 operative deaths (an operative mortality rate of 1.5%) and 7 late deaths. Of the surviving 323 patients, 170 were followed up for periods ranging from 1 to 6 years; 160 (94%) of these were considered cured, since they fulfilled all the following criteria: negative results from guinea-pig tests on gastric washing and sputum, as well as negative cultures on sputum and a negative direct smear on 3 consecutive days, and no active disease found at roentgenologic examination. One hundred forty-six (92%) of the 160 patients were working full time one year after the operation. The best cosmetic result and the best arm movements were obtained when the resection was performed without additional thoracoplasty. Mobilization of the diaphragm gave the best cosmetic but the worst functional result of the various space-diminishing procedures used in addition to segmental resection. Osteoplastic thoracoplasty gave a better cosmetic result and better arm movements when compared with thoracoplasty by rib resection. There was a higher incidence of postoperative pain in the patients on whom thoracoplasty by rib resection was performed. The encouraging late functional results proved that segmental resection can be performed with a minimal loss of function. The contralateral lung withstood the resection very well.

Bronchopulmonary Moniliasis: Treatment by Segmentectomy. J. H. Kennedy. J. Thoracic Surg. 37: 231-235 (Feb.) 1959 [St. Louis].

A 35-year-old man was admitted to Scripps Memorial Hospital in La Jolla, Calif., complaining of *recurrent hemoptysis for 2½ years.* There were no tubercle bacilli in the sputum on cultural examination of 3 specimens, and 3 specimens of sputum of the same unusual character with small black particles in them grew pure cultures of Candida albicans on modified eosin-methylene blue medium. In a roentgenogram of the chest a cavity was observed in the left midlung field; in the lateral view it appeared to lie in the superior segment of the left lower lobe. Thoracotomy was performed through the 5th intercostal space, and the superior segment of the left lower lobe was resected with ligation of the segmental vessels and closure of the segmental bronchus by interrupted sutures. The postoperative course was uneventful.

Gross examination of the operative specimen showed a thick-walled cavitary lesion measuring 3 cm. in maximal diameter. Microscopic examination revealed that this cystic lesion was partially lined with bronchial mucosa showing foci of squamous metaplasia. The cavity communicated with a bronchiole. Most of the cystic area was lined by fibrous tissue, into which there was a marked chronic inflammatory cellular infiltration. The fibrous tissue was covered with a hemorrhagic exudate. Within the cavity of the lesion, definite spore forms with mycelia were detected with periodic acid-Schiff stain. These fungi were consistent with C. albicans.

Four months after the operation the patient felt well and had returned to work, but he noticed a return of small amounts of mucoid sputum, containing small black particles. Culture of the sputum was again positive for C. albicans. The patient then was treated with inhalation therapy in which a bronchodilator and an aerosol of brilliant green dye in a 1 to 200,000 dilution by positive-pressure therapy were used for one month. The patient has now been well for one year, raises no sputum, and has had *no further bleeding episodes;* the small amount of mucoid secretion which he raises from his bronchial tree shows no cultural evidence of fungi. It is believed that this is the second report of successful surgical treatment of bronchopulmonary moniliasis.

Results of Hypophysectomy in the Treatment of Metastatic Mammary Carcinoma. O. H. Pearson and B. S. Ray. Cancer 12:85-92 (Jan.-Feb.) 1959 [Philadelphia].

This report is concerned with 218 patients with metastatic mammary cancer, who were subjected to hypophysectomy by transfrontal craniotomy between March, 1954, and March, 1958. The results obtained in the first group of 109 patients, who had a minimum follow-up of 17 months are presented, but data on the second group of 109 patients are also considered to some extent. The operation was well tolerated, and most patients were ambulatory in 24 to 48 hours. The average period of hospitalization for ambulatory patients was about 10 days. The *hormonal replacement therapy* after the operation consisted of 37.5 mg. of cortisone and 120 mg. of desiccated thyroid by mouth daily. Some patients required posterior pituitary powder by nasal insufflation for control of thirst and polyuria. During periods of stress, the patient usually required increased cortisone replacement. This regimen did not constitute a significant burden for the patient. Contrary to some notions, the patient who has undergone hypophysectomy has a normal appearance and normal mental and physical functions, and he or she can lead a normal life.

The mortality rate from all causes was 7.3%. Although the number of deaths in the second group of 109 patients was the same as that in the first, only one death in the latter group was directly attributable to the operation. Autopsy examination revealed very extensive metastases in the 8 patients of the second group who died postoperatively. Approximately 50% of the first group of 109 patients obtained objective remissions, and 35% had remissions that have lasted 6 months or longer. A prior favorable response to oophorectomy was found to be of prognostic value in predicting a beneficial effect from hypophysectomy. In this group hypophysectomy yielded better results than did adrenalectomy.

Estrogen administration to 5 patients after hypophysectomy failed to induce exacerbation of tumor growth, suggesting that a factor from, or mediated by, the pituitary is necessary for estrogen stimulation of tumor growth. Human growth hormone administered to 5 patients after hypophysectomy appeared to induce stimulation of the tumor growth in 2 patients. These preliminary observations suggest that growth hormone may be an important endocrine factor in mammary cancer. Hypophysectomy is recommended as a practical, worthwhile procedure in the palliative treatment of patients with metastatic breast cancer when adequate facilities are available to carry out this procedure.

Adrenalectomy for Disseminated Mammary Cancer: A Pilot Study of Sixteen Patients. R. C. Hickey. J. Iowa M. Soc. 49:83-87 (Feb.) 1959 [Des Moines].

The author assessed the effects of adrenalectomy on 16 patients with disseminated mammary cancer. The observation period ended in 1958 and covered more than 3 years in some cases; no patient has been followed up less than 6 months. The ages of the patients ranged from 30 to 69 years. No known antitumor therapy was used during the observation period. Oophorectomy was combined with adrenalectomy in most of the 16 patients. In 2 premenopausal patients oophorectomy essentially coincided with the adrenalectomy, and in postmenopausal patients combined oophorectomy and adrenalectomy were performed if a transabdominal adrenalectomy was done. Twenty-four hours preceding the operation the patients were given 50 mg. of cortisone orally every 6 hours, including 5 Gm. of sodium chloride and 2 to 5 mg. of desoxycorticosterone steroid administered by mouth. Two hours before the operation, 150 mg. of cortisone was given intramuscularly. Postoperatively, the regimen of 50 mg. of cortisone given intramuscularly every 4 to 6 hours was continued, supplemented by sodium chloride. The cortisone dosage was dropped gradually in 4 to 6 days to a maintenance dose of 37.5 to 50 mg. of cortisone in daily divided increments along with 3 Gm. of salt. In reducing the postoperative dosage cortisone was given alternately by mouth and intramuscularly to avoid crisis.

In 6 of the 16 patients with mammary cancer, objective improvement occurred with a striking degree of palliation for a mean duration of 12 months or longer. The relief of osseous pain was remarkable; soft-tissue masses regressed, so that palpable lumps became imperceptible and ulcers healed. The longest remission in a patient still doing well has been 38 months, and the shortest period of benefit has been about 6 months. One of the 16 patients experienced subjective improvement for 12 months, which extended her life to 15 months after the operation. Five of the 16 patients showed no improvement; 3 of them died within 2 months, 1 within 6 months, and 1 within 8 months after adrenalectomy. The emotional behavior of 1 of the 16 patients prevented classification of the result. There were 3 surgical deaths among the 16 patients. Death in one patient was caused by ventricular fibrillation and in the other by venous hemorrhage. The third patient died on the 4th day after a stormy postoperative hypoadrenal condition.

The selection of patients for adrenalectomy is partially a trial procedure. A patient must not be to ill for an operative procedure. Retrospective judgment indicates that 2 patients in this study who succumbed were too advanced in their illness to warrant such extensive therapy in the hope of palliation. The author may have erred in carrying out trials of exogenous hormonal administration in lieu of attempting early adrenalectomy in patients who awere failing clinically. It is, however, stressed that adrenalectomy should not be the first strong attempt at palliation. Other means should not be forgotten as one attempts to use or to judge hormonal manipulations or ablations. Focal roentgenologic treatment might well be used advantageously for fractures or osseous destruction, and the bypass of alimentary-tract obstructions may be essential. In judging the effects of adrenalectomy, one must accord other palliative procedures their proper place and merit, and the results of these must not be confused with or mistaken for the beneficial effects of adrenalectomy.

Results of Bilateral Adrenalectomy in the Management of Incurable Breast Cancer: Report of 155 Cases. A. A. Fracchia, A. I. Holleb, J. H. Farrow and others. Cancer 12:58-68 (Jan.-Feb.) 1959 [Philadelphia].

From January, 1951, through June, 1957, 155 patients with breast cancer who were subsequently subjected to adrenalectomy, alone or in combination with oophorectomy, were seen by the breast service of the Memorial Center for Cancer and Allied Diseases in New York. By analyzing the observations on these patients, the authors hoped to clarify further the indications and contraindications for adrenalectomy. It was found that the presence of circulating estrogen, estimated by quantitative analysis of urinary estrogens or by serial vaginal smears, is a valuable criterion for selecting patients for adrenalectomy. When there is no detectable estrogenic activity, ablative surgery is often followed by an unfavorable response, but the existence of estrogenic activity does not necessarily imply success after ablative therapy.

Patients who have benefited from the administration of testosterone or corticosteroids and those who have benefited from castration are more likely to respond favorably to adrenalectomy. The improvement is believed to be due to further suppression of estrogenic activity. Actively menstruating patients who have had a poor response to castration generally fail to derive benefit from adrenalectomy as well. Failure to respond to either androgens or corticosteroids does not preclude a remission with adrenalectomy. The estrogen provocative test is dangerous and not accurate in its predictions.

Adrenalectomy or oophorectomy combined with adrenalectomy produced valuable palliation for 6 months or longer in 54 (34.8%) of 155 patients in this study. This was evidenced by tumor regression with concomitant symptomatic relief and prolongation of life. Patients with inflammatory carcinoma, recurrent involvement of breast, soft tissue, and skin, and bone metastases had the highest percentage of regression, lived the longest, and often were afforded the most satisfactory palliation. The exception in the series with bone metastases was the group of patients with hypercalcemia, none of whom had remissions extending beyond one year.

Although patients with visceral metastases had remissions less frequently and of shorter duration, some did benefit by adrenalectomy. Functional disturbance due to visceral metastases indicated a poor prognosis and usually a poor operative risk. None of the patients with symptomatic preoperative brain metastases from mammary carcinoma benefited from adrenalectomy. Patients (usually menopausal) who underwent oophorectomy and adrenalectomy simultaneously had a higher rate of remission than did those in whom castration was performed first and adrenalectomy later. Hypophysectomy after adrenalectomy seldom produced benefit and is probably not worthwhile.

Intrathoracic Meningocele. H. D. Hilton and H. H. McCarthy. J. Thoracic Surg. 37:261-268 (Feb.) 1959 [St. Louis].

The authors collected from the world literature 27 cases of intrathoracic meningocele in 14 female and 10 male patients, between the ages of 7 weeks and 63 years, and in 3 patients with incomplete data. They also report 2 additional cases of intrathoracic meningocele in a 44-year-old man and in a 37-year-old woman. Fourteen of the 27 patients underwent surgical correction; 4 of the 14 patients died of causes related directly to the operation. The authors' 2 patients underwent myeloplasty and recovered with satisfactory results.

Intrathoracic meningocele is an anomaly usually associated with neurofibromatosis and typical skeletal changes affecting the thoracic vertebrae. The condition may be suspected or even anticipated whenever a posterior mediastinal tumor occurs in conjunction with skeletal changes and neurofibromatosis. Intrathoracic meningocele represents a progressively expanding lesion, subject to rupture, and likely to exert pressure effects on surrounding structures. Consequently, the treatment of choice is surgical repair of the defect.

NEUROLOGY & PSYCHIATRY

The Use of Carbon Dioxide in the Treatment of Postconcussion Syndromes. M. M. Gilbert. J. Florida M. A. 45:891-895 (Feb.) 1959 [Jacksonville].

The author treated 136 patients with a postconcussion syndrome by carbon dioxide–oxygen inhalations. Eighty-four of these patients had had symptoms for less than 6 months before treatment was instituted, and 52 had had symptoms for from 6 to 50 months before the institution of therapy. One hundred per cent carbon dioxide and 100% oxygen in separate tanks were supplied and mixed through a Y-tube so that the concentrations of each gas could be modified. The patients first were given 100% oxygen for a few breaths until they adjusted to the mask and inhalations. Then, about 5% carbon dioxide was added to the mixture to permit the patients to adjust to the odor of the gas. After a few whiffs, the carbon dioxide concentration was increased gradually until there was a 50% oxygen and a 50% carbon dioxide mixture given at about 8 to 10 liters per minute from each tank. This resulted in a profound hyperpnea, and within 10 to 20 inhalations the patients usually lapsed into coma. The masks then were removed, and the patients were allowed to recover spontaneously. Treatments were given 3 to 5 times weekly.

Of the 84 patients, after a median number of 19 treatments, 62 made a complete recovery, and 22 were improved. The complete recovery rate was 74%, and the improvement rate was 100%. Of the 52 patients with long-standing symptoms, after a median number of 22 treatments, 32 completely recovered, 18 were improved, and only 2 were therapeutic failures. They showed a recovery rate of 61%, which compared favorably with the recovery rate of 63% for the group as a whole and with the recovery rate of 74% for the group of patients who had been ill for less than 6 months. Discounting those who discontinued treatment, the over-all improvement rate was 98%. It is presumed that physiological and cellular changes occurred in either the cerebral cortex or the nuclear masses of the brain stem, or in both, as a consequence of brain concussion, these changes resulting in the subjective complaints known as postconcussion syndrome. The concept has been proposed that the carbon dioxide–oxygen inhalations decreased the irritability of the presumably damaged nerve cells by increasing the carbon dioxide tension, increasing the oxygen tension, and increasing the cerebral blood flow. Presumably, correction of the underlying dysfunction and healing occurred. This clinical report might provide a reference and stimulus point for further studies in which more rigid experimental control could be obtained.

Early Experiences with Ultrasonic Irradiation of the Pallidofugal and Nigral Complexes in Hyperkinetic and Hypertonic Disorders. R. Meyers, W. J. Fry, F. J. Fry and others. J. Neurosurg. 16:32-54 (Jan.) 1959 [Springfield, Ill.].

In surgical investigations directed at the basal ganglions to alleviate the hyperkinetic and hypertonic features of parkinsonism, chorea, athetosis, and dystonia, the interruption of the pallidopallidofugal complex was found effective, but the technical difficulty of the operation limited its implementation. The development of a focused multibeam ultrasonic instrument, by means of which lesions of predetermined size, shape, and position could be produced in the brains of animals, offered a safer and more precisely controllable tool for neuroanatomic, neurophysiological, neuropathological, and surgical investigation. This instrument was adapted to human use.

Eleven patients with severe bilateral parkinsonism and one patient with severe bilateral tension athetosis have now been subjected to 15 ultrasonic treatments; 2 received bilateral ultrasonic irradiation, and 1 was treated again on the same side. The procedures were performed while the patients were under local anesthesia. All 9 parkinsonian patients irradiated at the ansa lenticularis alone were relived of rigidity. In 4 of these tremor was simultaneously abolished, and in 2 others it was initially a negligible feature of the clinical picture. Tremor persisted in 3 patients in whom it was subsequently eliminated by irradiation of more caudally situated sites. Within 3 weeks of the ultrasonic treatments, 5 patients exhibited some decrements in the gains realized during the treatments and for the ensuing several days. During the next few months it became evident that the decrements were transient in 3 patients but were enduring in the remaining 2. In view of the early post-treatment decrements and the primarily experimental objectives of the program, irradiation was performed in the 5 most recent treatments at the geometric site (alone) corresponding to portions of the substantia nigra and its immediate superior medial neighborhood. In all cases the first exposure promptly reduced the tremor in at least one and, more often, both contralateral limbs. Rigidity was simultaneously reduced after this first exposure. Further exposures of the "nigral region" counteracted the tremor and abolished or alleviated the rigidity.

With regard to relief of rigidity in parkinsonian patients, a somatotropic differentiation in the "ansal region" was recognizable in at least some patients: a rostrosuperior region corresponds to the contralateral upper limb, and a caudoinferior region to the lower limb. This differentiation was observed more often than not. In addition, a topographic differentiation in the "ansal region" between neural representations of the flexor and extensor muscles of the contralateral limbs was noted in some patients. In some parkinsonian subjects, irradiation fully encompassing the "ansal region" was not followed by reduction of tremor, even though rigidity was abolished in the contralateral limbs. This observation indicates that in such patients tremor is mediated by a different neural mechanism than that subserving rigidity. On the other hand, irradiation of the "nigral region" was always followed by prompt abolition of tremor and simultaneous reduction of rigidity. It may be deduced that the portion of the neural mechanisms subserving tremor and rigidity in the "nigral region" are here closely associated, perhaps even share neural components.

The patient with quadriplegic tension athetosis was irradiated at the "ansal region" on the left side and, 4 months later, at the "nigral region" on the right. The hypertonus was reduced in the contralateral limbs. As to the hyperkinesia, involuntary thrusting movements of the tongue and lips subsided after the left "ansal" irradiation, permitting easy feeding for the first time in years. The athetotic movements in the limbs of the right side were reduced in vigor, amplitude, and frequency and, during repose, were in abeyance. Crude purposive acts could now be executed with the right upper limb. The athetosis of the left-sided limbs was completely abolished after "nigral" irradiation on the right.

DERMATOLOGY

Superficial and Deep Mycoses in Cuba: A Report Based on 1,174 Cases. V. Pardo-Castello and F. Trespalacios. South. M. J. 52:7-15 (Jan.) 1959 [Birmingham, Ala.].

The authors report on 1,174 patients with superficial and deep mycoses, who were observed at the clinic for dermatology of the University Hospital in Havana, Cuba. Of the 1,174 patients, 249 had tinea of the scalp, 227 had tinea cruris, 206 had dermatophytosis of the feet, 144 had onychomycosis, 78 had tinea of the glabrous skin, 71 had chromoblastomycosis, 64 had candidiasis, and 135 had miscellaneous conditions. Tinea of the scalp was most commonly caused by Microsporum canis. One case occurred in a one-month-old infant. The treatment of tinea kerion with penicillin administered locally and systemically was considered most successful. Trichophyton rubrum and T. mentagrophytes were the common agents in dermatophytosis of the feet, with Epidermophyton floccosum next in order. Most cases of onychomycosis were caused by T. rubrum. Treatment with 40% salicylic acid plaster and subsequent administration of antifungal preparations were considered to be the method of choice. In 70 of the 71 patients with deep-seated chromoblastomycosis, Fonsecaea (Hormodendrum) pedrosoi was recovered in cultures. In one case the fungus was identified as Cephalosporium carrionii. Among 135 patients with miscellaneous conditions, there were 10 with sporotrichosis, 7 with actinomycosis, and 6 with mycetoma of the feet. From the latter 6 patients, Nocardia brasiliensis was recovered 3 times, N. pelletieri twice, and Monosporium apiospermum once.

BOOK REVIEWS

Treatment in Internal Medicine. *By* Harold Thomas Hyman, M.D. With foreword by Walter C. Alvarez, M.D. Cloth. $12.50. Pp. 609, with illustrations. J. B. Lippincott Company, E. Washington Sq., Philadelphia 5. 4865 Western Ave., Montreal 6, Canada; Pitman Medical Publishing Company, Ltd., 45 New Oxford St., London, W. C. 1, England, 1958.

The writer of the foreword of this volume states, "In this book, I find that Dr. Hyman has again gathered together an amazing amount of information on treatment, and on treatments that have recently been developed." What is amazing is the amount of misleading and wrong information that it contains. In sentences replete with such terms as "anti-infectives," "toxicoderms," "adrenergics," "tuberculocide," "probatory treatment," "antitensives," and "generalist" the reader is told some surprising things. For instance on the first page, apropos of "an integrated program for the care of the infected patient," it is stated that the busy practitioner has neither the time nor the facilities for exhaustive investigation. Hence he is advised to make an "educated guess" on the basis of clinical findings, then "open fire with the particular therapeutic product that appears most apt to decimate the assailant, and least apt to add insult to the defendant's existing injuries. . . . When probatory treatment has proved unrewarding and/or when potential hazards of improvisation appear to exceed possible risks of temporary delay the clinician asks for (1) isolation and identification of the invading pathogen, (2) an estimate of the quality and potency of the patient's antibody responses, and (3) accurate titrations of the particular microbe's sensitivity to available anti-infective agents. With these data at hand he substitutes or inaugurates scientific anti-infective treatment." Many jokes have been concocted over this sequence of events, but never before has such a procedure been seriously advised in a textbook of medicine.

We are advised that penicillin should usually be given orally but if intramuscular use is thought necessary, benzathine penicillin G is the preferred preparation. In the index the reference to subacute bacterial endocarditis directs the reader to hemophilus infections, apparently an error. After some searching a short reference was found to it under a discussion of the "streptococcoses." A 14-day course of daily doses of 6 million units of potassium penicillin G with 2 Gm. of dihydrostreptomycin daily, both intramuscularly, is advised, but no mention of ristocetin is made. On page 22 the reader is advised to "prevent and actively treat staphylococcal, streptococcal and gram negative bacillary super-infections with parenteral streptomycin-dihydrostreptomycin mixtures or with injectable neomycin (3 to 6 mg. per lb. per day)." On page 35, discussing the immediate care of virus pneumonitis, a loading dose of 1 Gm. of "any tetracycline to which the patient has not recently been exposed" is advised. Then the choice of novobiocin, erythromycin, carbomycin, or oleandomycin also is offered. "With failure of response, suspect an error in diagnosis. Collect sputum for microscopy (fungi, acid-fast bacilli) and culture. Obtain blood for culture." And so it goes.

Long lists of proprietary preparations available for treatment are presented with each section of the book. There are many practical hints on the care of the patient in the home which obviously were learned through experience. Because of its many inaccuracies this book cannot, however, be recommended for general use.

Textbook of Surgery. Edited by Guy Blackburn, M.B.E., M.Chir., F.R.C.S., Surgeon, Guy's Hospital, London, and Rex Lawrie, M.D., M.S., F.R.C.S., Surgeon and Assistant Director of Department of Surgery, Guy's Hospital. With foreword by Sir Russell Brock, M.S., F.R.C.S., F.A.C.S., Thoracic Surgeon, Guy's Hospital. Cloth. $16.75. Pp. 1122, with illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1958.

This new textbook of surgery represents an attempt to survey the field of general surgery and the surgical specialties, with the exception of ophthalmology and otolaryngology. The authors state that one of the main objectives was to aid the student preparing for final examinations. Emphasis was, therefore, laid particularly on the clinical side of surgery, and discussion of surgical pathology as well as operative detail was reduced to a bare minimum. The book is well written and the large type is easy to read. The major subdivisions are clearly outlined and there are many excellent illustrations, some of which are in color. It seems unlikely, however, that this book will serve fully the purpose intended for the serious medical student or for the graduate physician. On the one hand it is too long to be merely a synopsis, while on the other it is too short and incomplete to be a well-rounded textbook for the graduate student. It is estimated that those American textbooks which have proved popular contain at least twice the total amount of material presented here. It seems likely, therefore, that this text will find its greatest value as an introduction to a course in surgery for students in the preclinical years, or perhaps as a textbook for nurses.

These book reviews have been prepared by competent authorities but do not represent the opinions of any medical or other organization unless specifically so stated.

QUESTIONS AND ANSWERS

ANTISTREPTOLYSIN TITER

To the Editor:—*What is the significance of an antistreptolysin titer which remains consistently above 833 units? This occurred in a patient with acute glomerulonephritis in whom all urinary findings were normal for over a year. The sedimentation rate was also normal.*

Glenn T. Howard, M.D., Alice, Texas.

Answer.—Because the upper limit of normal for antistreptolysin titers is considered to be 50 Todd units, it is obvious this patient has an elevated titer. One can only conclude that he has been exposed, or is being exposed, to streptococcic toxin of sufficient antigenic quality and quantity to cause antibody formation. Whether this has been occasioned by the attack of nephritis or by a reaction to some other streptococcic infection cannot be stated, because the titer prior to the attack of nephritis or during the early stages of the disease is not known. It is likely that the present high titer was caused by the disease, but the finding does not now indicate anything more than past or present exposure to antigenic streptococci. This significantly points up the limitations of a single determination of antistreptolysin titer. In the absence of other clinical data to indicate illness in the past year, one may conclude that the present titer is without clinical significance.

SENILE ACHLORHYDRIA

To the Editor:—*In an annual examination program which included the quinine carbacrylic resin test for gastric acidity, about 25% of persons tested were found to have achlorhydria. The patients were of the type usually found in general practice, including many elderly persons. The question arose as to whether a gastrointestinal series should be done on all with achlorhydria. An occult blood test was performed, and this helped in making some decisions.*

Vernon E. Roth, M.D., Marcellus, N. Y.

Answer.—With increasing age, the stomach tends to form less acid, just as the sebaceous glands in the skin form less fat. In 1932, Vanzant and coworkers (*Arch. Int. Med.* 49:345, 1932) studied gastric analyses of 3,746 persons who, after x-ray studies, did not appear to have any organic disease of the digestive tract. They found the incidence of achlorhydria to rise from almost zero in patients at 20 years of age to around 25% in patients at 65. In almost all of these patients the loss of gastric acidity had not produced any symptoms and seemed to need no treatment. The incidence of carcinoma is higher in the atrophic gastric mucosa of persons with primary anemia; hence, these persons should have stomach x-rays at least once a year. However, all persons past the age of 40 ought to have stomach x-rays once a year to be on the safe side. If one waits to do something about cancer of the stomach until it gives symptoms, there will be an even chance that no surgeon will want even to explore the abdomen; if the surgeon does think it worthwhile to explore, there will be an even chance that he will not attempt a resection; and, if he does resect, the chances will be about 70 to 30 that there will be a recurrence. Obviously, the wise person will have the stomach x-rayed at yearly intervals so that if a lesion is found it will probably be operable and resectable.

Answer.—The quinine carbacrylic resin test is valuable in screening for gastric acidity, but it does not reveal a true achlorhydria. This is accomplished by doing a gastric analysis with the use of betazole hydrochloride or histamine. Studies have shown that about 10% of all persons over 65 years of age have achlorhydria after such a potent stimulus. It would be only in these persons that a gastrointestinal series would be definitely indicated.

ACHONDROPLASIA

To the Editor:—*A 24-year-old woman has had three children, the last two of whom died at or shortly after birth with achondroplasia. Because of this condition, which is supposedly transmitted through the male, her husband had a vasectomy last year. The patient wants to have more children. Since she is having great difficulty trying to adopt a child, because of the demand, she is willing to consider artificial insemination, provided she can be reassured she will not have the same results as with her last two pregnancies. Is there any doubt that achondroplasia is always transmitted by the male?*

M.D., Pennsylvania.

Answer.—There is no basis for the belief that achondroplastic dwarfism is transmitted only through the male. It is normally transmitted as a dominant, but, since neither parent shows the defect, it appears probable that it arose as a new mutant—whether in the husband or in the wife it is impossible to say. If it came from the husband,

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The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any medical or other organization unless specifically so stated in the reply. Anonymous communications cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

normal offspring would be expected from the proposed artificial insemination. If the mutation was in the wife's ovary, however, she might bear another defective child.

CARBON MONOXIDE POISONING

To the Editor:—*Could the symptoms in the following case be caused by anoxia or methane poisoning? A new space heater had been installed in the living room of the patient's home a few days before this incident. At 1 a.m., a 26-year-old man was found lying in his living room doorway with what first appeared to be a shaking chill. He had vomited and had urinary and fecal incontinence, but he was not unconscious and could answer simple questions. He was pale but not cyanotic. There was no odor of gas in the house (the natural gas used in this area is supposed to have an identifying odor added). The patient was hospitalized, and he felt improved by the time he was admitted but still complained of headache and chilliness. He had had a cold for a few days. A roentgenogram of the chest showed an increase in the bronchovascular pattern. Urinalysis was normal. The hemoglobin level was 9 Gm.%. Babinski's, Chvostek's, and Trousseau's signs were negative. There was no carpopedal spasm. Knee jerks were not obtained. The patient's temperature did not go over 99 F (37.2 C). He was well enough to be discharged at 5 p.m. on the day of admission but could not return to work for a week because of bronchitis and vomiting. Two hours after his admission to the hospital his wife, sister, and two small children in the bedroom were simultaneously seized with headache and vomiting which subsided a few hours after they vacated that apartment. The patient later explained that he had been sitting in the living room watching television while his wife was out and the two children were sleeping in another room. He noted a sharp headache and nausea, but his legs seemed paralyzed and he fell in the doorway as he was telephoning his wife to come home. The space heater had been installed with the warning not to run it continuously before it had been "readjusted," but because of the extremely cold weather it had been burning all day and was not shut off until the other members of the family became ill. Since its removal there has been no further trouble.* *M.D., Massachusetts.*

Answer.—The five patients referred to in this inquiry all suffered from acute carbon monoxide intoxication. The clinical findings in each patient were typical. Some authorities mention that a common finding is a red or cherry red color of the face, but in this consultant's experience pallor is found in about half of the patients with acute intoxication due to carbon monoxide; this is particularly true when vomiting has occurred. The exaggeration of the bronchovascular markings was due to the presence of a respiratory infection and had no relationship to the carbon monoxide poisoning, and the low hemoglobin value seems likewise unrelated. Chemical determination for carbon monoxide in the blood stream made on the husband's admission to the hospital (or shortly thereafter) would have confirmed the diagnosis. Carbon monoxide is one of the most important intoxicants associated with man's life and with the field of industry. It also has an extremely ancient history: its significance began when cave man lit his first fire, and in written records its effects were mentioned by Aristotle in about 300 B. C. and by Seneca in 68 A. D. Today it is a serious economic problem as one of the most subtle and dangerous of the intoxicants in either factory or home life. Natural gas does not contain carbon monoxide and, therefore, cannot cause carbon monoxide intoxication, provided that other gases have not been added to it. On the other hand, various types of manufactured gases and by-product gases may contain 5 to 40% of carbon monoxide; hence, the leakage or escape of such gases can produce carbon monoxide intoxication. Carbon monoxide is formed whenever any organic material is burned with incomplete combustion or too little oxygen. All standard textbooks are full of references to such occurrences with various types of stoves, grates, heaters, braziers, and salamanders. This is precisely what happened in this case, and it is to be noted that warning was given regarding running the space heater continuously and without readjustment. Furthermore, the space heater was not ventilated in any manner, and, presumably, because of the extreme cold, the windows of the rooms were not open. In the monograph by Drinker (Carbon Monoxide Asphyxia, London, Oxford University Press, 1938, pp. 97-103), the composition of natural gas, dangers of heaters, mechanism of the formation of carbon monoxide, and similar subjects are discussed in detail.

ALLERGY TO SILVER PROTEINS

To the Editor:—*What is the danger of an allergic response to topical application of the various types of silver protein solutions?*

Harold A. Abramson, M.D., Cold Spring Harbor, N. J.

Answer.—The danger of an allergic response to topical application of silver protein solutions appears to be remote. The nonallergic reaction of argyria (a grey, blue, slate blue, or brown discoloration of the skin, due to deposition of silver) formerly was fairly common because topical application of silver protein solution to the mucous membranes was frequently continued over long periods, but proved allergic responses to silver protein solutions are exceedingly rare. Howard (*Laryngoscope* 40:215, 1930) reported a patient who developed nasal blockage after he had used a mild silver protein preparation apparently with impunity for several years. The blockage subsided when use of this agent was discontinued. Subsequently, when it was applied again, the patient developed severe urticaria, angioneurotic edema, and collapse. Criep (*J. A. M. A.* 121:421-422 [Feb. 6] 1943) reported a patient who developed sneezing, blockage, rhinorrhea, and wheezing in the course of local treatment with a mild silver protein preparation in the nose and severe asthma when his throat was sprayed with this solution. Scratch tests with a 1% solution of this substance gave positive results, and an intradermal test with this solution was followed by a severe local and mild constitutional reaction. The ophthalmic test also gave positive results. Antibodies were demonstrated in the patient's serum by means of the passive transfer method. Since negative findings were obtained on skin tests with silver nitrate, Criep concluded that the reaction was due to either the protein or the silver protein combination. Additional cases of allergic sensitivity to silver protein solutions may have occurred, but they have not been reported.

COMPOUND TIBIAL FRACTURE

To the Editor:—*One year ago, a patient sustained a multiple-compound fracture of his right leg. In one fracture site, the lower third of the tibia, there is still only a fibrous union in spite of open reduction and approximation of the tibial fragments with a stainless steel screw. What can be done to insure final healing of this fracture? What has been the experience with polyethylene and urethan "glue"?*

S. Perlroth, M.D., New York.

Answer.—Among the important factors that may be related to the nonunion of this fracture are the violence of the trauma which induced the fracture, the initial treatment as related to scene of the accident, the time lapse between injury and definitive treatment in the hospital, the primary method of immobilization and its duration with or without changes for improvement of position or angulation, the relationship of internal fixation to date of injury, the duration of external fixation and non-weight-bearing after fixation of fragments with the screw, the patient's present state of health, his emotional reaction to his problem, and his blood chemistry. If a fibrous union is now said to prevail, it is important to know when and how the basis for this statement was established. Knowing this, together with consideration of the above factors, one might confidently conclude that the patient has a delayed union rather than a nonunion. Continued immobilization is indicated. No surgical procedure should be considered to insure final healing until the state of nonunion has been established on the basis of all reliable criteria, including a liberal consideration for the criteria of time. Fractures of the distal third of the tibia are noted for the frequency of delayed union and; less frequently, nonunion. For this reason, it is wise to be guided by the laws which govern the healing of fractures instead of rushing into surgical treatment. If the indications for an operation should be established in this instance, the transplantation of cancellous iliac bone to the fracture site should be considered. There are too many unanswered questions regarding the use of polyethylene and urethan glue to warrant their use. These should not be added to the complications which are known to prevail in this case.

COLONIC POLYPS

To the Editor:—*A 42-year-old man was operated on for polyps of the colon and rectum. A resection of the sigmoid was performed. Two polyps showed early malignant changes. There was no invasion of the serosa, and the mesenteric lymph nodes were free of metastases. What are the chances for complete and permanent cure? Inasmuch as this patient has a tendency to develop colonic polyps, what can he do in the future to avoid them? What is the role of protein foods and, in particular, dairy products in the development or prevention of these polyps?*

M.D., Illinois.

Answer.—The chances for complete and permanent cure are excellent. This consultant knows of nothing that can be done to prevent future polypoid formation, but a proctoscopic examination should be made annually without fail. A colon x-ray examination with use of the air contrast technique should be made every two or three years. If new polyps are detected proctoscopically, an x-ray examination of the colon should be made at once and the newly discovered polyps fulgurated or removed without delay. There are no drugs or special diet which would prevent recurrence. Protein and dairy foods do not play any role in the development of polyps.

THROMBOANGIITIS OBLITERANS

To the Editor:—*Are there any detectable signs in the oral mucosa which might hint at latent thromboangiitis obliterans? Are these signs influenced by recent smoking?*

Richard L. Westerman, M.D., Gunnison, Colo.

Answer.—This consultant is unaware of any vascular lesion in the oral mucosa suggestive of thromboangiitis obliterans. It is true that this disease may occur in many visceral vessels, including cardiac, renal, and cerebral arteries. While many systemic disorders have characteristic signs in the oral cavity, thromboangiitis obliterans is not one of them.

WASHINGTON NEWS

Hearings on Radiation Hazards . .
International Research Bill Advances . .
Research Spending Curb Sought . .
Law Admitting Aliens with TB Approved . .
Prescription Abuse Crackdown Planned . .

RADIATION FALL-OUT HEARINGS OPEN

Scientists offered lawmakers sharply differing opinions on the danger of radioactive fall-out from nuclear tests as a House-Senate atomic energy subcommittee opened an intensive investigation of the controversy.

The dispute broiled over into the international field as a U. S. Commission on Radiation Protection and the International Commission on Radiological Protection went in opposite directions in revising maximum permissible levels of radiation for the general population. The international group lowered the standards, while the National Committee on Radiation Protection and Measurements hiked the danger levels.

About the only real agreement seemed to be that the radioactive matter deposited into the atmosphere by nuclear tests does not do any good and probably does some harm. But how much was the question.

Underlying the entire issue is the contention by some members of the Atomic Energy Committee that the Atomic Energy Commission is minimizing the dangers to the public because of what it believes to be the overriding necessity of continuing atom and hydrogen bomb tests to keep the United States militarily prepared. This has been flatly denied by AEC officials.

AEC Chairman John A. McCone disclosed that the commission's General Advisory Committee would soon "give further assurance to the people of the world about the very small hazard resulting from fallout." He said the danger now is not serious when compared with natural sources of radiation such as x-rays. Continued unrestricted testing, though, could lead to serious danger, he declared.

Pointing up the scientific confusion, Dr. Charles L. Dunham of the AEC's Division of Biology and Medicine told the House-Senate subcommittee at its opening hearing that fall-out "might" cause 50 to 100 additional bone cancer cases a year for the next 70 years and 100 to 200 extra cases of leukemia annually. However, he said these were estimates based on one current theory, and "there may be no additional cases at all."

Rep. Chet Holifield (D., Calif.), chairman of the subcommittee, expressed concern at AEC figures on the amount of radioactive debris that has been deposited by the U. S., Great Britain, and Russia. He noted that the 40,000 kiloton total (21,000 kilotons by the Soviet Union; 19,000 by the Western powers) in 1957 and 1958 far exceed a safety limit of 10,000 kilotons annually that was set by a group of scientists at the subcommittee's previous hearings on the subject in 1957.

E. A. Martell of the Air Force's Cambridge Research Center testified that the 30-year exposure to dangerous radioactive matter in the northern hemisphere would be more than 10 times what AEC officials have estimated.

SENATE GROUP APPROVES INTERNATIONAL RESEARCH BILL

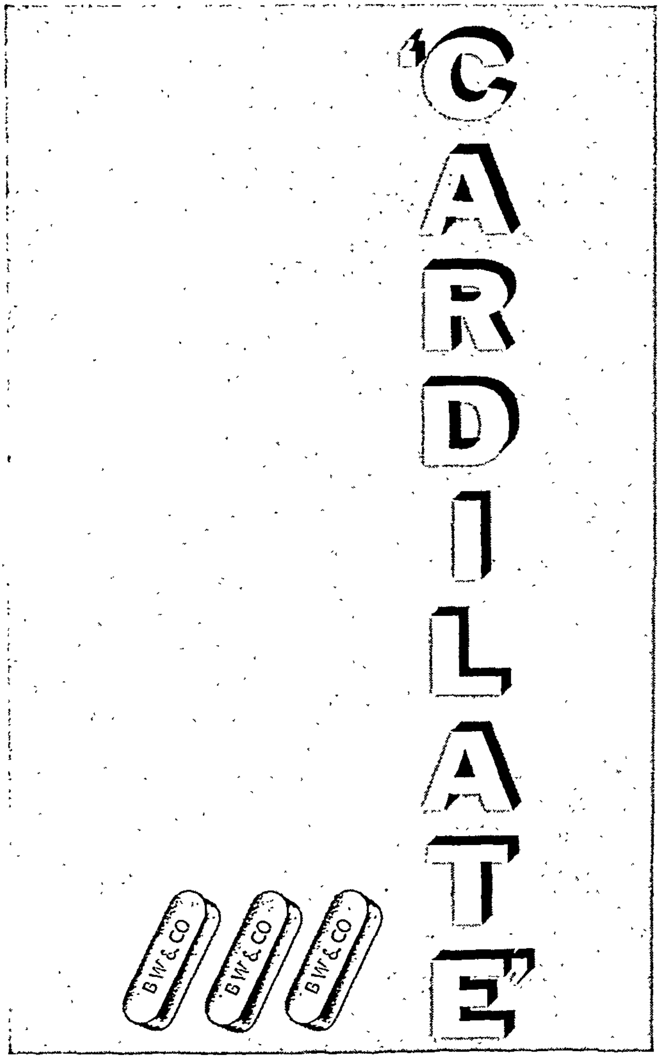
The Senate Labor and Public Welfare Committee, as expected, approved a 50-million-dollar annual program to expand international health and medical research. The program, endorsed by the American Medical Association, would come under the U. S. surgeon general and be run as part of the National Institutes of Health.

A new National Institute for International Medical Research would be established under the measure that is backed by 59 senators. Though the administration objected to some features of the measure, including the flat 50-million-dollar annual authorization, the widespread support among the lawmakers appeared to assure easy congressional passage this session.

FLEMMING ASKS SENATE TO HOLD LINE ON HEW SPENDING

Arthur S. Flemming, secretary of Health, Education, and Welfare, has carried over to the Senate his fight to keep the HEW budget down to the size proposed by the administration.

(Continued on next page)



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Testifying before a Senate appropriations subcommittee headed by Sen. Lister Hill (D., Ala.) he declared that "if the Federal Government does not act to strengthen the economy, combat inflation, and assure fiscal stability, we will end up by spending more dollars to buy less."

However, Senator Hill, who also is chairman of the full Labor and Public Welfare Committee, remarked that he thought the House in approving increased funds had "followed an awful good precedent." He noted that his subcommittee had increased money for HEW for the past six years.

The National Institutes of Health would receive 50 million dollars more than the $292,700,000 requested under the appropriations measure okeyed by the House. All of the new money would go for medical research and training. Several hundred new employees could be hired.

The measure grants the Food and Drug administration 2 million dollars more than the budget request, bringing the agency's appropriations for the fiscal year starting July 1 to a record total of $13,800,000.

Many private physicians spoke in support of higher medical research outlays in testimony before the House appropriations subcommittee that first considered the money bill. One of the witnesses, Dr. Stewart H. Clifford, assistant clinical professor of pediatrics, Harvard Medical School, had this to say:

"I think the problem boils down to what is morally and ethically right and what is wrong. I believe that to go to the American people and tell them that in order to make what has been said to be a fraction of a percent saving in the budget you have been forced to curtail research projects that may be of tremendous value to the citizens would boomerang on those that advised such false economy."

HEW Secretary Flemming, in his Senate testimony, declared it was difficult to see how research would be impaired under the administration's program, noting that the total requested was the same as approved by Congress last year in a big increase over the administration's 1958 request. Furthermore, he said, some of last year's appropriation will not be spent this fiscal year.

In other testimony before the Senate appropriations subcommittee, U. S. Surgeon General Leroy E. Burney asserted there is a shortage of trained personnel in all health fields, including research.

HOUSE VOTES EXTENSION OF LAW ADMITTING ALIENS WITH TB

The House passed and sent to the Senate legislation continuing for two years, until June 30, 1961, authority to admit aliens afflicted with tuberculosis into the United States provided rigid medical supervision is afforded.

The measure, aimed in large part at permitting Korean orphans to come to this country to adopted parents, requires that sponsors file affidavits stating that financial arrangements for the aliens' care have been made with a hospital. Assurance also has to be given that the alien will go to a hospital immediately on admission.

As of the end of last March, 1,567 persons had been admitted under the law. The A. M. A. has urged stricter medical standards than were provided previously.

FDA PLANS LEGAL MOVE ON P. R. N. ABUSES

A Food and Drug Administration official said the agency is making plans to bring a court case against any pharmacist who commits "flagrant violations" in refilling p. r. n. prescriptions.

Nevis Cook of FDA's enforcement division said *present law needs to be clarified and that a court* suit might settle the issue. Some pharmacists, he said, have been using no discretion in refilling prescriptions for sleeping pills, amphetamines, and other drugs that can be misused. The legal issue is whether indiscriminate refilling of this type of prescription by pharmacists constitutes an improper assumption of the practice of medicine, according to the official who urged physicians to use care in making out "Refill as Occasion Requires" prescriptions.

INSURANCE INDUSTRY VIEWS ON HEALTH COVERAGE FOR U. S. WORKERS

A spokesman for the nation's life insurance companies told congress that a deductible feature in any health insurance plan for federal civilian workers would "result in a much more economical and efficient health care program."

Manton Eddy, speaking for the Health Insurance Association of America and the Life Insurance Association of America, told a Senate labor and public welfare subcommittee that the organizations warmly endorse such insurance for government employees.

A deductible provision under which employees would pay a certain amount of the cost before they are compensated by the insurance company "will operate to remove the substantial administrative burden of handling a very large number of claims for *minor illnesses*," he *said*.

The administration recommended deductibility also. The subcommittee headed by Sen. Richard M. Neuberger (D., Ore.), is considering various proposals to cover federal workers.

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Riseman, J. E. F., *et al.*: Circulation *17*:22, 1958

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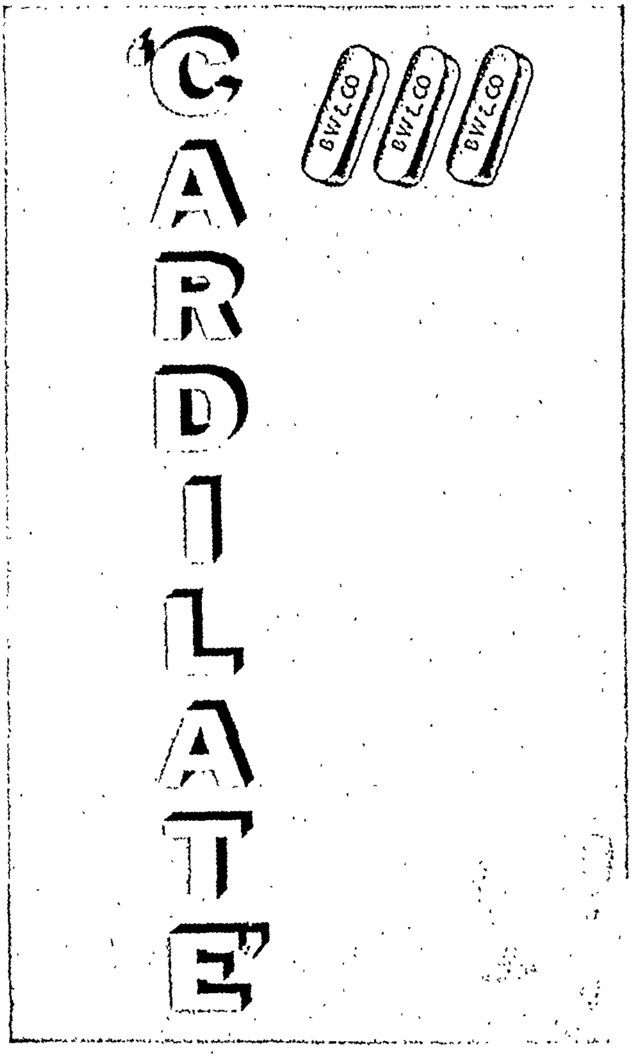

MEETINGS

AMERICAN MEDICAL ASSOCIATION: Dr. F. J. L. Blasingame, 535 North Dearborn St., Chicago 10, Executive Vice President.
1959 Annual Meeting, Atlantic City, June 8-12.
1959 Clinical Meeting, Dallas, Texas, Dec. 1-4.
1960 Annual Meeting, Miami Beach, Fla., June 13-17.
1960 Clinical Meeting, Washington, D. C., Nov. 29-Dec. 2.
1961 Annual Meeting, New York City, June 26-30.
1961 Clinical Meeting, Denver, Nov. 28-Dec. 1.

AMERICAN

1959

May

American Association for the History of Medicine, Wade Park Manor, Cleveland, May 21-23. Dr. John B. Blake, Smithsonian Institution, Washington 25, D. C., Secretary.

American Association on Mental Deficiency, Hotel Schroeder, Milwaukee, May 19-23. Dr. Neil A. Dayton, Mansfield State Training School & Hospital, Mansfield Depot, Conn., Secretary-Treasurer.

American College of Cardiology, Benjamin Franklin Hotel, Philadelphia, May 26-29. Dr. Philip Reichert, 480 Park Ave., New York 22, Secretary.

American Gynecological Society, The Homestead, Hot Springs, Va., May 21-23. Dr. Andrew A. Marchetti, 3800 Reservoir Rd., N. W., Washington 7, D. C., Secretary.

American Ophthalmological Society, The Homestead, Hot Springs, Va., May 28-30. Dr. Maynard C. Wheeler, 30 West 59th St., New York 19, Secretary.

American Trudeau Society, Palmer House, Chicago, May 25-27. Dr. E. P. K. Fenger, 1790 Broadway, New York 19, Secretary.

American Urological Association, Western Section, Monterey, Calif., May 17-21. Dr. James Ownby Jr., 516 Sutter St., San Francisco, Registration Chairman.

Georgia, Medical Association of, Bon Air Hotel, Augusta, May 17-20. Mr. Milton D. Kreuger, 875 W. Peachtree St., N. W., Atlanta, Executive Secretary.

Illinois State Medical Society, Hotel Sherman, Chicago, May 19-22. Dr. Harold M. Camp, 224 S. Main St., Monmouth, Secretary.

International College of Surgeons, Alabama Surgical Section, Erskine Hotel, Huntsville, May 21-22. Dr. E. V. Caldwell, 2515 Memorial Pkwy., S. E., Huntsville, Ala., General Chairman.

International College of Surgeons, New York State Section, Concord Hotel, Kiamesha Lake, May 28-31. Dr. Milton S. Weinberg, 3741 75th St., Jackson Heights, N. Y., Chairman, Arrangements Committee.

Massachusetts Medical Society, Hotel Statler, Boston, May 19-21. Dr. Robert W. Buck, 22 The Fenway, Boston 15, Secretary.

Minnesota State Medical Association, Hotel Duluth, Duluth, May 25-27. Mr. R. R. Rosell, 496 Lowry Medical Arts Bldg., St. Paul 2, Minn., Executive Secretary.

National Tuberculosis Association, Palmer House, Chicago, May 24-29. Mrs. Wallace B. White, 1790 Broadway, New York 19, Secretary.

Nevada Academy of General Practice, Hotel Riverside, Reno, May 21-23. For information write Dr. Roy M. Peters, 495 S. Arlington Ave., Reno, Nev.

Ogden Surgical Society, Ogden, Utah, May 20-22. Dr. O. E. Grua, 412 First Security Bldg., Ogden, Utah, Secretary.

Pacific Northwest Society of Pathologists, Olympic Hotel, Seattle, May 14-16. Dr. Nelson R. Niles, University of Oregon Medical School, Portland 1, Ore., Secretary-Treasurer.

June

American Academy of Tuberculosis Physicians, Atlantic City, N. J., June 6. Dr. Oscar S. Levin, P. O. Box 7011, Denver 6, Secretary.

American College of Angiology, World Conference on Angiology, Marlborough Blenheim Hotel, Atlantic City, N. J., June 5-7. Dr. Alfred Halpern, 11 Hampton Court, Great Neck, N. Y., Executive Secretary.

American College of Chest Physicians, Atlantic City, N. J., June 3-7. Mr. Murray Kornfeld, 112 E. Chestnut St., Chicago 11, Executive Director.

American Dermatological Association, Claridge Hotel, Atlantic City, N. J., June 1-4. Dr. Wiley M. Sams, 25 Southeast 2d Ave., Miami, Fla., Secretary.

American Diabetes Association, Chalfonte-Haddon Hall, Atlantic City, N. J., June 6-7. Dr. E. Paul Sheridan, 1 East 45th St., New York 17, Secretary.

American Electroencephalographic Society, Claridge Hotel, Atlantic City, N. J., June 11-14. Dr. Jerome K. Merlis, University Hospital, Baltimore 1, Secretary.

American Gastroenterological Association, Claridge Hotel, Atlantic City, N. J., June 5-6. Dr. Franz J. Ingelfinger, 69 E. Newton St., Boston 18, Secretary.

American Gastroscopic Society, Atlantic City, June 7. Dr. Arthur M. Olsen, 200 First St., S. W., Rochester, Minn., Secretary-Treasurer.

American Geriatrics Society, Hotel Traymore, Atlantic City, N. J., June 4-5. Dr. Richard J. Kraemer, 2907 Post Rd., Warwick, R. I., Secretary.

American Medical Association, Traymore Hotel, Atlantic City, N. J., June 8-12. Dr. F. J. L. Blasingame, 535 N. Dearborn St., Chicago 10, Executive Vice-President.

American Medical Women's Association, Sheraton Ritz Carlton Hotel, Atlantic City, N. J., June 4-7. Miss Lillian T. Majally, 1790 Broadway, New York 19, Executive Secretary.

American Neurological Association, Claridge Hotel, Atlantic N. J., June 15-17. Dr. Charles Rupp, 133 S. 36th St., Philadel Secretary.

American Orthopedic Association, Lake Placid Club, Lake N. Y., June 16-18. Dr. Lee Ramsey Straub, 535 E. 70th St., New 21, Secretary.

American Physical Therapy Association, Hotel Leamington, M apolis, June 21-26. Miss Annetta Cornell Wood, 1790 Broadway, York 19, Executive Director.

American Proctologic Society, Shelburne Hotel, Atlantic City, June 15-18. Dr. Norman D. Nigro, 10 Peterboro St., Detroit 1, Secr

American Rheumatism Association, Mayflower Hotel, Washin D. C., June 2-6. Dr. Edward F. Hartung, 580 Park Ave., New Yo Secretary.

American Therapeutic Society, Shelburne Hotel, Atlantic City, June 4-7. Dr. Oscar B. Hunter Jr., 915-19th St., N. W., Washing D. C., Secretary.

Association for Research in Ophthalmology, Inc., Atlantic City, June 8-12. Dr. Lorand V. Johnson, 10515 Carnegie Ave., Clevela Secretary-Treasurer.

Catholic Hospital Association of the United States and Ca St. Louis, June 1-4. Mr. M. R. Kneifl, 1438 S. Grand Blvd., St. Lo Executive Secretary.

Gastroenterology Research Group, Claridge Hotel, Atlantic City, June 4. For information write Dr. Charles F. Code, Mayo Clinic, R ter, Minn.

Idaho State Medical Association, Sun Valley, June 14-17. Mr. A L. Bird, 364 Sonna Bldg., Boise, Executive Secretary.

Intermountain Pediatric Society, Sun Valley, Idaho, June 26-2 J. R. Newton, Memorial Medical Center, 2000 S. 9th E., Salt Lake Utah, Publicity Chairman.

International Cardiovascular Society, North American Cha Hotel Shelburne, Atlantic City, N. J., June 6. Dr. Paul T. De 3503 Prytania St., New Orleans, Secretary.

Maine Medical Association, The Samoset, Rockland, June 21-2 Daniel F. Hanley, P. O. Box 240, Brunswick, Executive Directo

Medical Library Association, King Edward-Sheraton Hotel, To Can., June 15-19. Miss Nettie A. Mehne, The Upjohn Co., Kala Mich., Secretary.

Society for Investigative Dermatology, Ritz Carlton Sheraton Atlantic City, N. J., June 6-7. Dr. Herman Beerman, 255 S. 17 Philadelphia 3, Secretary.

Society of Biological Psychiatry, Claridge Hotel, Atlantic City, June 13-14. Dr. George N. Thompson, 2010 Wilshire Blvd., Los A 57, Secretary.

Society of Nuclear Medicine, Palmer House, Chicago, June 1 Dr. Morris T. Friedell, 104 S. Michigan Ave., Chicago 3, Chai Press & Public Relations Committee.

South Dakota State Medical Association, Sheraton Johnson Rapid City, June 20-23. Mr. John C. Foster, 500, 1st National Bldg., Sioux Falls, Executive Secretary.

The Endocrine Society, Chalfonte-Haddon Hall, Atlantic City, June 4-6. Dr. Henry T. Turner, 1200 N. Walker St., Oklahoma C Secretary.

Upper Peninsula Michigan Medical Society, Gateway, Land of L Wis., June 19-20. Dr. Richard D. Cecconi, Iron Mountain, Mich., retary.

Wyoming State Medical Association, Jackson Lake Lodge, M June 11-14. Mr. Arthur R. Abbey, Box 2036, Cheyenne, Exec Secretary.

July

American Society of Facial Plastic Surgery, New York City, July Dr. Samuel M. Bloom, 123 E. 83rd St., New York 28, Secretary.

American Society of X-ray Technicians, Shirley Savoy Hotel, Den July 4-9. Miss Genevieve J. Eilert, 16 14th St., Fond du Lac, Executive Secretary.

Oregon Cancer Conference, University of Oregon Medical Sch Portland, July 16-17. Dr. Martin A. Howard, 1115 S. W. Taylor Portland 5, Ore., Chairman.

Rocky Mountain Cancer Conference, Brown Palace Hotel, Den July 22-23. Dr. N. Paul Isbell, 835 Republic Bldg., Denver 2, Chairm

August

American Congress of Physical Medicine and Rehabilitation, H Leamington, Minneapolis, Aug. 30-Sept. 4. Miss Dorothea C. Augus 30 N. Michigan Ave., Chicago 2, Executive Secretary.

American Dietetic Association, Statler Hilton, Los Angeles, Aug. 25- Miss Ruth M. Yakel, 620 N. Michigan Ave., Chicago 11, Execut Secretary.

American Hospital Association, Statler Hotel, New York City, A 24-27. Dr. Edwin L. Crosby, 18 E. Division St., Chicago, Director Secretary.

American Veterinary Medical Association, Hotel Muehlebach, Kan City, Mo., Aug. 24-28. H. E. Kingman Jr., D.V.M., 600 S. Michig Ave., Chicago 5, Executive Secretary.

Biological Photographic Association, Inc., Sheraton-Mount Ro Hotel, Montreal, Canada, Aug. 31-Sept. 3. Miss Jane H. Waters, B 1668, Grand Central P. O., New York 17, Executive Secretary.

National Medical Association, Detroit, Aug. 10-13. Dr. John T. Giv 1108 Church St., Norfolk, Va., Secretary.

Nevada State Medical Association, Reno, Aug. 19-22. Dr. Gilbert Lenz, 505 S. Arlington Ave., Reno, Nev., Chairman.

Rocky Mountain Radiological Society, Shirley-Savoy Hotel, Denv Aug. 20-22. Dr. John H. Freed, 4200 E. Ninth Ave., Denver 20, Secr tary-Treasurer.

West Virginia State Medical Association, The Greenbrier, Wh Sulphur Springs, Aug. 20-22. Mr. Charles Lively, P. O. Box 103 Charleston 24, Executive Secretary.

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EFFECT OF A PRACTICAL DIETARY REGIMEN ON SERUM CHOLESTEROL LEVEL

Philip A. Boyer Jr., M.D., James T. Lowe, Ph.D., Robert W. Gardier, Ph.D.
and
John D. Ralston, M.D., Indianapolis

THE medical literature over the past few years contains a wealth of material on the role of diet in relation to health and disease, particularly atherosclerosis, and a number of excellent reviews[1] have appeared. Data have been accumulated from many countries of the world, encompassing three principal disciplines: epidemiologic, experimental, and clinical. With few exceptions, the evidence points to a significant correlation between diet, hypercholesteremia, atherosclerosis, and coronary heart disease. Intensive research efforts are being directed toward gaining a better understanding of the nature of these relationships and the many factors known to influence them directly or indirectly.

The urgency of the undertaking is manifested by the fact that heart disease continues to be the number one cause of death in the United States and that the rate appears to be increasing rather than decreasing. Equally disturbing is the fact that atherosclerosis, the forerunner of coronary artery disease in 97% of the cases, is no longer solely a disease of the aged. Autopsy studies on soldiers with an average age of 22 years, who were killed in the Korean war, showed atherosclerosis to be present in 77% of the cases.[2] "Among adults in the United States, at least, the question is not who has atherosclerosis, but rather who has more and who has less."[3]

The fact that experimentally produced atheromatous plaques are reversible lesions suggests the possibility of benefit from diets tending to lower the blood cholesterol levels. The effects of a diet of this sort were studied in 300 institutionalized patients under conditions permitting rigorous control. The significant feature was the use of a margarine containing 64.2% of nonhydrogenated corn oil. The kitchen staff prepared the same dishes as before with few modifications, and the transitions from contratest to test diet went unnoticed by the majority of patients and by many members of the staff. In a nine-month study it was shown that this dietary alteration raised the percentage of linoleic acid in the diet about 300% and significantly reduced the blood cholesterol levels in a manner acceptable both to the patients and to the staff.

While the exact relationship between hypercholesteremia, atherosclerosis, and coronary heart disease still remains to be determined, evidence is

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From the Research Division of the Pitman-Moore Company and the Central State Hospital.

steadily accumulating on the desirability of reducing cholesterol levels in those patients where they are elevated. The Framingham studies [4] have shown that persons with high cholesterol levels suffer a far greater risk of coronary heart disease than those with low levels. In this study of over 1,000 men, aged 45 to 62 years, covering a four-year span, the incidence of coronary heart disease varied from a low of 15 per thousand at one end of the scale, to a high of 295 per thousand at the other end. The three main factors implicated in the development of coronary disease were elevated serum cholesterol levels, high blood pressure, and excess weight. Data from such studies show that it is possible to quantitate the risk of coronary heart disease by evaluating these factors along with other pertinent information from the patient's history. The ability to classify a patient as a high coronary risk in an actuarial sense permits the timely application of appropriate prophylactic or therapeutic measures. With respect to the factors incriminated in these studies, blood pressure can now be controlled within limits, obesity can be corrected, and hypercholesteremia can be reduced.

Studies on the production of experimental atherosclerosis in animals have also yielded valuable information on the nature of this disease. It has been shown that within limits the atheromatous plaques are reversible lesions. Thus, arterial atheromas in rabbits, chickens, and dogs have been found to undergo gradual regression when the hypercholesteremia was corrected through dietary manipulation. In studies on human tissue cultures of aortic cell, the deposition of cholesterol has been accelerated by the inclusion of a saturated fatty acid (stearic) in the medium and has been inhibited by the inclusion of an unsaturated fatty acid (linolenic).[5] Numerous cases of regression of cutaneous xanthomas in persons placed on low-fat diets have been reported.[6] It seems clear that cholesterol deposits in at least some tissues can be resorbed in the human.

In 1952 Kinsell and co-workers [7] showed that the ingestion of diets rich in vegetable oils produced a fall in blood cholesterol levels and this observation was subsequently confirmed by other investigators. Later work showed that it was the essential unsaturated fatty acids in the diet which exerted the cholesterol-lowering effect, while the saturated fatty acids exerted a cholesterol-raising effect. These findings have given rise to a wholly new concept in the formulation of special dietary regimens, stressing the importance of the unsaturated versus the saturated fatty acid content. As information on amounts of these factors present in different foods has become available,[8] the therapeutic dietitian has received new tools with which to devise palatable, interesting, and effective blood cholesterol-lowering diets.

While direct clinical proof of the value of reducing elevated cholesterol levels is not yet available, supporting evidence in favor of such a step continues to accumulate. Morrison [9] has found that the use of dietary regimens designed to decrease blood cholesterol levels is followed by definite improvement in patients with angina pectoris or myocardial infarction, and Kinsell and co-workers [10] have seen functional improvement in patients with peripheral vascular disease which can be associated with reduced cholesterol levels.

Dietary supplements in the form of safflower oil, corn oil, and vegetable oil cocktails have recently been employed as means to reduce serum cholesterol levels with varying degrees of success. However, when used in effective amounts, the additional caloric intake presents real problems in weight control. The exchange of one fat isocalorically in the diet for another would obviate this difficulty. Since the removal of saturated fat from the diet has been shown to be more effective in reducing blood cholesterol levels than the addition of unsaturated fat,[11] the most expedient approach would appear to be the replacement of a regular article of diet rich in saturated fats with one rich in unsaturated fats.

Method

A corn oil margarine rich in essential unsaturated fatty acids was developed as a substitute for the ordinary solid fats in the diet, including those used for cooking [12] as well as those used for a spread. The margarine contains 64.2% nonhydrogenated corn oil and 15.9% of hardened fats. It contains 44.5% of linoleic acid calculated on the basis of total fat.

The effectiveness of a dietary regimen in lowering blood cholesterol levels in which this corn oil margarine replaced other solid fats in the diet was studied over a period of nine months. The work was carried out at the Farm Colony of Indiana's Central State Hospital where ideal conditions existed for the complete and rigorous dietary control of over 300 institutionalized patients. Subjects were ordinary psychotics free from any major organic disorder and included men and women in the ratio of approximately four to one. The average age of the patients, both men and women, was 60 years. The average weight of the men was 149 lb. (67.6 kg.); of the women, 136 lb. (61.7 kg.).

The diet kitchen was under the supervision and control of a graduate dietitian who prepared the menus and rotated them on a weekly basis. Dishes varied considerably from day to day but the over-all menu from week to week remained essentially constant. Meals were carefully planned so as to be nutritious, palatable, well balanced, and adequate for a population engaged in moderate physical activity. The same food was served the staff as the patients, and the meals were uniformly referred to as being good. The control diet was simply a continuation of the regular diet in which butter, hydrogenated fats, and vegetable oils were customarily used either on the table or in the kitchen. The treatment diet was essentially the same, except that corn oil margarine was substituted routinely for these solid fats and was used as a table spread as well as for all cooking, baking, and frying, and, when melted, as a seasoning agent for vegetables. In the preparation of salad dressings and in other places where a liquid oil was desired, corn oil was used exclusively. The kitchen staff prepared exactly the same dishes as previously, serving the same kind and cuts of meat as before. Excess visible fat was removed, however, and bacon drippings were discarded. Reconstituted skim milk was substituted for whole milk, whether used as a beverage or in cooking, and sherbet was substituted for the ice cream served twice weekly. Aside from these changes, every effort was made to maintain the same basic diet during the treatment period as during the control period. Weekly menus for the control period and the treatment period were analyzed statistically for total calories, calories from fat, and calories from linoleic acid. The figures were calculated from the food supplied the kitchen, rather than the food consumed. No effort was made to measure the actual food intake during the study.

Serum cholesterol levels were determined at periodic intervals during the initial control period of three weeks, the treatment period of five months, and the post-treatment (control) period of three months. The analytical method used was a modification of the Schoenheimer-Sperry technique. A total of 301 patients were included in the study, although the number available for blood samples on any one occasion varied from 277 to 298. Determinations of serum cholesterol level were made 11 times over the course of the study for a total of 3,177 individual analyses—each done in duplicate.

Body weights were recorded at five different times during the study; once on the control diet, three times on the treatment diet, and once on the post-treatment (control) diet.

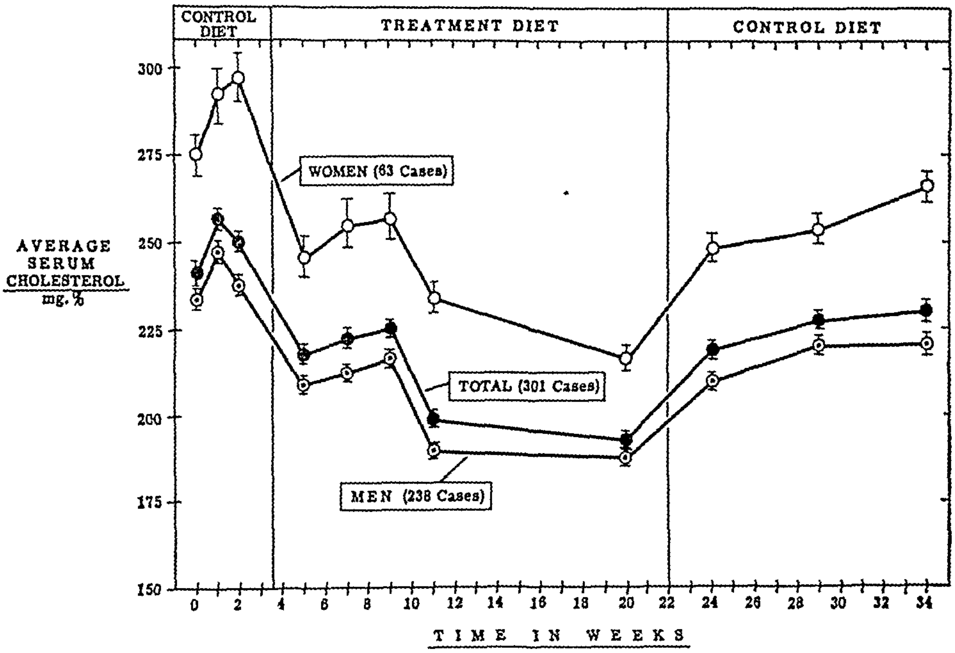

Fig. 1.—Effect of practical dietary regimen on serum cholesterol levels in 301 patients.

Results

The curves showing the variations in serum cholesterol levels for the 238 men, the 63 women, and the 301 men and women, averaged together over the three different periods of study, are presented in figure 1. It will be seen that the curves for the men and the women run remarkably parallel. The higher values for the women are in accord with reports from other investigators for this age bracket.[13] A 13% drop in serum cholesterol levels occurred for the combined groups within three weeks after the inauguration of the test diet, from 250 to 218 mg.%. The drop was accentuated as the treatment continued, reaching a maximum fall of 23% after five months on the diet, from 250 to 193 mg.%. When the control diet was reinstituted, serum cholesterol levels rose 19% over a three-month period, from 193 to 230 mg.%. These data are for the men and women grouped together. An examination of the weights for both men and women during the five different weighing periods showed that the maximum change for either sex between any two periods was less than 1 kg. (2.2 lb.).

The data on cholesterol values were also analyzed in relation to three other factors, namely, age, weight, and control cholesterol levels for both men and women, as shown in figure 2. The comparison was made between the average of the three cholesterol levels during the control period with the average of the first three levels during the treatment period. The line of demarcation for any category was arbitrarily established at that point which would permit an equal number of cases to be above and below a given value. In the case of age, the dividing line was

60 years for both men and women. In the case of weight it was 149 lb. for men and 136 lb. for women. In the case of the control cholesterol level, it was 237 mg.% for men and 288 mg.% for women. A statistical evaluation of the cholesterol values for groups stratified on this basis showed no significant effect on the percentage change in average values resulting from the diet. Thus, age, weight, and control cholesterol levels were without effect under these conditions.

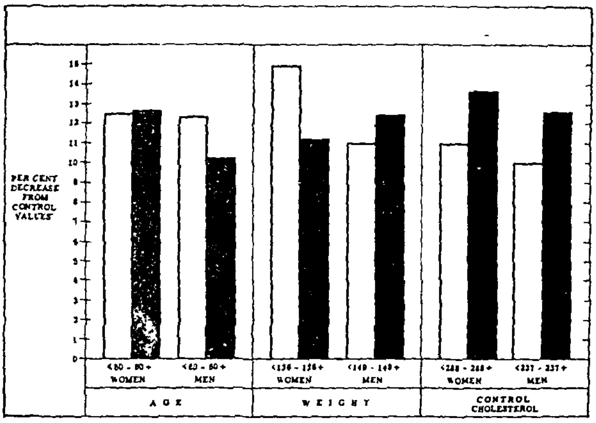

Fig. 2.—Effect of age, weight, and control cholesterol levels on percentage change in average values resulting from diet.

An analysis of the control and treatment diet in regard to total fats, calories from fat, and calories from linoleic acid is presented in figure 3. Values were computed on the basis of food supplied the kitchen rather than on actual food consumption and, therefore, are only approximate. Total calories for a week on the control diet amounted to 15,500; on the treatment diet 14,600. Total fat amounted to 828 Gm. per week on the control diet and 700 Gm. per week on the treatment diet, representing 48% and 43%, respectively, of the total calories. The linoleic acid content amounted to 60 Gm. per week on the control diet and 153 Gm. per week on the treatment diet, representing 7% and 22%, respectively, of the fat calories. The percentage of linoleic acid in the fat of the treatment diet was thus triple the percentage of linoleic acid in the fat of the control diet.

Comment

The treatment diet followed in these studies was unique in that it represented no conspicuous departure from the general food pattern to which the patients were accustomed. It allowed them to continue enjoying meals as they had always known them, without the need for acquiring new "tastes" for different dishes or for old familiar dishes prepared in a bland or unappetizing fashion. The treatment diet corresponded so closely to the regular diet that the transition went unnoticed by the majority of the patients including many members of the staff.

The study was designed to be conducted at a practical level in order to determine what results might be expected under normal operating conditions. No effort was made to influence the patients' voluntary intake of food at any time. The food consumption was virtually the same during the control and the treatment period, and there were no significant changes in body weight during the course of the study. Comparison of the percentage of calories from fat in the two diets showed a 5% lower level in the treatment diet. This can be accounted for largely by the use of skim milk in place of whole milk and of sherbet in place of ice cream. The influence of these minor dietary alterations in reducing serum cholesterol levels is considered relatively unimportant in this instance, since another study[14] in which these variables were excluded produced essentially the same response. The significant feature is that the percentage of linoleic acid in the diet was effectively raised about 300% without disturbing the basic dietary pattern or without the addition of added calories—thus offering no problems in patient acceptability or in weight control. While an institution provided the type of control group needed for a large scale study under standardized conditions, the findings would appear to be directly applicable to home use.

	CONTROL DIET	TEST DIET
TOTAL FAT	828 Gms.	700 Gms.
CALORIES AS FAT	48%	43%
LINOLEIC ACID	60 Gms.	153 Gms.
FAT CALORIES AS LINOLEIC	7%	22%

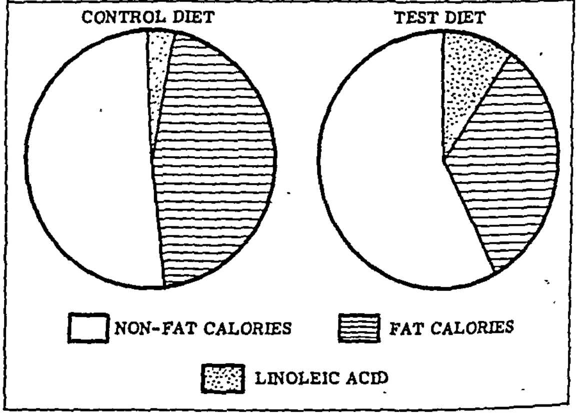

Fig. 3.—Amount of fat and linoleic acid in weekly diets.

Summary

In a nine-month study of over 300 inpatients in a state institution, it was found that a regimen employing a nonhydrogenated corn oil margarine for other solid fats as the principal dietary alteration was effective in achieving and maintaining a reduction in blood cholesterol levels. The dietary alteration was accomplished simply, easily, and inconspicuously, and with an excellent degree of patient acceptability.

P. O. Box 1656 (6) (Dr. Boyer).

Dr. C. L. Williams, Superintendent of Central State Hospital, provided facilities for this study.

The corn oil margarine used in this study was supplied as Emdee margarine by Pitman-Moore Company, Indianapolis.

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AIR HYGIENE FOR HOSPITALS

II. EFFICIENCY OF FIBROUS FILTERS AGAINST STAPHYLOCOCCIC DROPLET NUCLEI AND BACTERIA-BEARING DUST

Henry F. Allen, M.D., Boston

A laboratory and operating room study shows that it is possible to provide absolute filtration of bacteria on dust particles and high retention of bacterial droplet nuclei through installation of certain deep-bed glass-fiber material in the hospital ventilating system. A glass-asbestos paper offered retention in the same range. No hospital should accept an installation which has not been found to retain at least 85% of atmospheric dust or its equivalent. Careful performance testing of the installation is essential.

There is general agreement that air supplied to delivery rooms, operating rooms, and nurseries should be free from dust and bacteria. On the one hand, pure air is needed to maintain dilution of airborne contaminants derived from human sources inside these areas; on the other hand, the demonstrated fact that pathogenic organisms may enter such spaces via air-conditioning ducts[1] must be guarded against by efficient cleaning of air supply.

To insure satisfactory performance over long periods, devices for delivering clean air should be simple and trouble-free and should require a minimum of maintenance.[2] Recent developments in the field of air filtration permit realization of these objectives at reasonable installation expense and low operational costs. This paper reports studies of the arrest of bacteria-bearing particles by fibrous filters in experimental and actual situations.

Bacteria in air occur as droplet nuclei or are attached to minute particles of dust, lint, or skin. The former are produced by the atomization of re-

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From the bacteriology laboratory, Massachusetts Eye and Ear Infirmary, and the Department of Ophthalmology, Harvard Medical School.

spiratory secretions, as during talking, laughing, coughing, or sneezing. These droplets approximate 10μ in diameter and evaporate almost instantly in air of a relative humidity of less than 100%.[3] The droplet nuclei which remain after evaporation consist of one or more bacteria with a coating of dried organic material. They are usually between 1.34 and 2.68μ in diameter[4] and settle at an average rate of 0.04 ft. per minute in still air. As convection currents tend to keep room air in constant motion, bacterial droplet nuclei tend to remain in a state of continuous suspension.

Bacteria-bearing dust particles are thought to vary greatly in size and to be much larger than droplet nuclei. Most of them settle at 1 or 2 ft. per minute in still air,[5] but some may be continuously suspended in moving air.

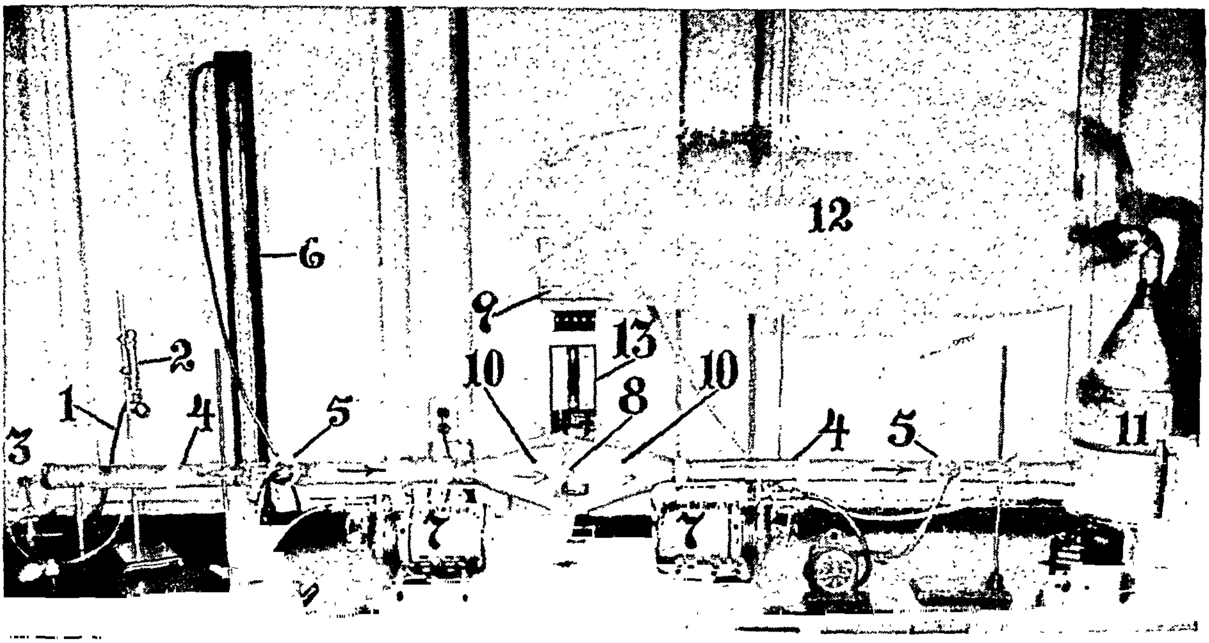

Fig. 1.—Filter-blower system: 1, nitrogen supply line; 2, flow regulator; 3, DeVilbiss 40 nebulizer; 4, location of dispersion disk; 5, sampling point (MF holder); 6, mercury manometer; 7, vacuum pumps; 8, filter medium in holder; 9, water gauge manometer; 10, filter holder; 11, fan; 12, calibrated bag (not used during tests); 13, wet and dry bulb thermometers.

Ventilating air is cleaned by passage through devices which operate on one of the following principles: (1) impingement on mediums coated with viscous material, (2) impaction on fine fibers of dry porous mediums, (3) electrostatic precipitation, or (4) washing or scrubbing by passage through wet cells or fine sprays.[6]

The antibacterial efficiency of viscous and wet cell filters is too low to warrant their use in critical hospital areas. Electronic air cleaners have been reported[7] to possess high efficiency against airborne bacteria and viruses but will not be discussed in this paper. Fibrous filters may be made of fabric-like mediums of wool felt or cotton batting or cloth; deep-bed mats composed of glass fibers averaging between 0.8 and 3.0μ in diameter, which may be bonded together by phenolic resins; or papers of cellulose and asbestos, glass, glass and asbestos, or ceramic fibers with or without a binder. A great increase in filtering surface can be achieved by pleating these materials. Air velocities through the medium usually range from 5 to 25 ft. per minute. In general, units presenting a superficial area of 4 sq. ft. provide an air flow of 1,000 cu. ft. per minute at an average duct velocity of 250 ft. per minute. Retention of particles by these mediums is largely the result of inertial impaction of particles on fibers. In addition, the static gas film around fibers may interfere with the passage of particles.

Although physicians do not ordinarily carry out performance tests on air filters, an understanding of the basis for efficiency rating is important. This is because a filter which is highly efficient against particles 10μ in diameter may be extremely inefficient against particles 1μ in diameter. A case in point is the poor performance of viscous filters against atmospheric dust.

Deep-bed mats composed of glass fibers averaging between 0.8 and 3.0μ in diameter are rated by the National Bureau of Standards (NBS) discoloration test with atmospheric dust used as the test material; that is, against particles averaging 0.5μ in diameter. Their efficiency increases with the useful life of the filter as particles build up on the filter face. Efficiencies from 35 to 95% over the life of different grades of filters are achieved at the rated velocity. The initial resistances of the various mediums range from 0.14 to 0.48 in. water gauge at the rated velocity.

Paper filters are rated by the NBS discoloration test or in terms of their efficiency against dioctyl phthalate (DOP) smoke, an aerosol of particles uniformly 0.3μ in diameter. Absolute filters achieve a minimum guaranteed arrest of 99.95% against DOP smoke. Their retention of bacteria approaches 100%. This high efficiency is obtained at the cost of increased resistance to air flow.

Experimental Studies

There are few studies of the efficiency of fibrous mediums against micro-organisms. Decker and coworkers[8] tested the efficiency of three grades of glass-fiber pads and of two types of mineral papers against freshly atomized aerosols of Serratia indica and Escherichia coli T-3 bacteriophage. A single-thickness pad possessing the characteristics of Filterdown 50-FG retained 99% of the bacteria and 98% of the bacteriophage. Penetration of the glass-asbestos paper was 2.8 to 14 per 10 million organisms; of type E glass paper, 1 to 2 per 100 million organisms.

TABLE 1.—*Characteristics of Fibrous Filter Materials*

Code	Trade Name	Material	Diameter of Glass Fiber, μ	Efficiency, %*	Rating Test	Rated Velocity, Ft. per Min.	Pressure Drop, In. H_2O§	Efficiency vs. Bacterial Droplet Nuclei, %	Efficiency vs. Dustborne Bacteria, %
H 93...	CM 114	Glass-fiber paper	<1.0	99.97	DOP†	5.5	0.90	99.97	100
H 93 B.	*Micretain*	*Glass-asbestos paper*	*<1.0*	*95*	*DOP*	*5.0*	*0.40*	*96.7-98.1*	*100*
Ceramic....	Fiberfrax	Aluminum silicate paper	2.4	83	DOP	5.0	0.18	97-98	>99
50-FG..	Filterdown	Glass-fiber mat	1.25	90-95	NBS‡	21.0	0.48	87-99	>99
C 95....	Aerosolve 95	Glass-fiber mat	1.0-1.1	90-95	NBS	23.0	0.35	89-98	>99
C 85....	Aerosolve 85	Glass-fiber mat	0.8-0.9	80-85	NBS	25.0	0.22	54-69	...

* During useful life of filter.
† Dioctyl phthalate 0.3 μ smoke.
‡ National Bureau of Standards discoloration test.
§ At rated velocity.

Because the bacterial species used by these workers is particularly vulnerable to drying,[9] and because neither it nor the bacteriophage is likely to be encountered in environmental air, it seemed desirable to confirm these studies and to extend them to a pathogenic species more resistant to drying, to bacteria attached to dust particles, and to other filter materials. At the same time an opportunity was afforded to compare two sampling techniques in the light of newer knowledge regarding one of them.[10] With these purposes in mind the following test situation was established.

Materials.—A filter-blower system was adapted for bacterial sampling of air upstream and downstream from the filter medium. The assembly (fig. 1) consisted of several feet of round, galvanized, sheet metal duct 2 in. in diameter, a filter holder composed of two four-sided funnels with flanges by means of which the funnels could be clamped base to base, and a fan at the downstream end of the system. The filtration surface was 6.5 in. on a side, with an area of 0.29 sq. ft.

The downstream section of the filter holder incorporated a fine, stiff stainless steel screen to provide backing for the filter medium being tested. The screen was spot-soldered to the flange, and the interstices of the meshwork were filled with aluminum powder in a plastic base so as to present a flush, smooth border 1.25 in. wide around the periphery of the filtering surface. A gasket of spun glass fiber was cemented to the downstream flange and one of 0.12-in. foam rubber to the upstream flange. Clamps were used to maintain firm pressure through the opposed flanges on the filter medium between the gaskets.

The ducts were equipped with dispersion disks located five duct diameters upstream from each sampling point to provide thorough mixing of the aerosol before sampling. The sampling points were located 20 in. downstream from the intake and from the filter holder respectively. All joints were made airtight with sealing tape.

Air samples were taken through right-angle glass tubes, 6 to 8 mm. in diameter, inserted through the duct wall and pointing upstream in the center of the duct. The air was sampled for bacterial content either by filtration through cellulose ester gel membranes (Millipore filters [MF]) or by bubbling through critical orifice liquid impingers containing 200 cc. of 3.2% brain-heart infusion with 0.2% gelatin solution,[10] the stem being 4 cm. from the bottom of the container. The pH of the impinger fluid was 7.2. A loopful of a silicon antifoaming agent (Antifoam A) was added to each impinger. Sampling rates were 2.0 to 4.5 liters per minute, a pressure drop of 24 in. Hg being maintained across the critical orifices during operation. The dimensions of the sampling tubes were selected to make the sampling velocity approximately isokinetic with the central duct velocity.

Fresh aerosols were produced by atomization of bacterial suspensions from a DeVilbiss 40 nebulizer activated by nitrogen from a commercial cylinder at a flow rate of 6.4 liters per minute; 12-to-24-hour broth cultures of Staphylococcus aureus (Food and Drug Administration strain 209, American Type Culture Collection 6538) were diluted with sterile distilled water to a degree suitable for sampling after nebulization. The organisms were less than 1μ in diameter and were highly dispersed.[11]

Dry aerosols were produced by insufflating fine dust obtained from the filter cones of ward vacuum cleaners into the duct from a powder blower. These dust-coated cones retain almost 100% of airborne bacteria contacting them.[11] The principal species recovered from this dust were represented by strains of yellow and white staphylococci, hay bacilli, sarcinae, and assorted molds. It is probable that the bacterial particles were not in a state of high dispersion in these aerosols.

The properties of the several filter materials tested are shown in table 1. At least three samples from one or more lots of each medium were tested, and at least three trials were made with each sample.

Operation.—The humidity of the room air was adjusted to the desired level by allowing steam to flow from the chamber of an autoclave into the room. The rate of air flow through the system was adjusted by controlling the fan speed to produce the desired velocity at the filter face. Flow rates were measured directly by timing the inflation of a calibrated bag of light-weight polyethylene, capacity 5.5 cu. ft. (fig. 1).

Table 2.—*Retention of Nebulized Staphylococci by a Single Pad of Filterdown 50-FG**

Sampler	Colonies per Liter†		Efficiency, %
	Upstream	Downstream	
Millipore filter	257	3.4	98.68
Impinger	920	9.4	98.98
Impinger: Millipore filter	3.57	2.75	

* Temperature 23 C, relative humidity 34%.
† Sampling rate, 2 liters per minute.

With air flowing through the system at the desired rate, fresh or dry aerosols were introduced at the intake and allowed to flow for from 1 to 30 minutes before sampling was begun. Sampling was carried on simultaneously at the upstream and downstream sampling points, usually for 60 seconds.

At the end of each run, the filter membranes were transferred to the surface of trypticase soy agar plate or aliquots of the impinger fluid were filtered through Millipore filters (HA type) which were incubated on the same solid medium. After incubation of the plates at 37 C for 24 hours and 22 C for 12 hours colonies were counted under magnification, using the ophthalmic biomicroscope and slit lamp (Zeiss Opton).

Conditions and Controls.—The temperature during these experiments varied from 21 to 24 C; the relative humidity was adjusted between 31 and 71%. The construction of the system insured that no room air was drawn into it or the samplers other than that which was introduced at the intake. Organisms present in the room air were not of the test species and were numerically insignificant in proportion to those in the artificial aerosols, and their occasional presence appeared to have no effect on the results.

In a representative number of trials, but not in all, the filters and the downstream sections of the filter holder and ducts were sterilized by hot air between tests. Failure to sterilize them in other trials appeared to make no difference in the results of these tests, presumably because the test organisms were not present on, or were not liberated by blow-off from, the filter pads or the interior surfaces of the ducts in significant quantities. The sampling membranes were sterilized by autoclaving.

The experimental techniques used in this study are described more fully in the first paper of this series.[11] At the relatively low filtration velocities and the relatively small sampling volumes used in the present study there was no evidence that variation of the relative humidity within the range recorded above had any effect on either the efficiency of filtration by the glass-fiber materials or the recovery of organisms on the sampling membranes (MF). In contrast to conditions in the former study [11] there was no warming or drying of air during its passage through the filter-blower system. Humidification of sampled air by passing it through 18-in. by ¾-in. tubes containing rolled moist filter paper failed to increase the yield of organisms on the MF in comparative tests with air of 39% relative humidity at a sampling rate of 2 liters per minute.

There was no evidence of increasing penetration of the fibrous materials with time. Rather, it was clear that accumulation of dust on the filters increased their retention of bacteria. Filterless trials indicated an expected recovery rate of 90% or better at the downstream sampling point. No correction for this factor was made in calculating efficiency of filtration.

Results.—The findings recorded in table 1 refer to retention of bacterial droplet nuclei by new, unused filter materials in terms of the dry (aerosol assay) Millipore filter sampling technique. When parallel sampling by this method and by liquid impingers operated at an identical rate (2 liters per minute) was conducted simultaneously at both the upstream and the downstream sampling points, impinger counts were 3.3 to 3.57 times those on the MF at the upstream point and 2.75 to 2.9 times those on the MF at the downstream point. In spite of the threefold disparity in absolute values filtration by the glass-fiber medium demonstrated by both methods was of the same order of efficiency. It is presumed that the larger number of organisms recorded by the impinger represents both break-up of bacterial aggregates by it and decay of organisms after contacting the MF surface. The former factor could account for the slightly higher efficiencies demonstrated by the impinger technique, since aggregates which would produce only a single colony on the MF would presumably be arrested by the glass-fiber filters more readily than single cells. The fact that the efficiency of the more retentive materials appeared nearly the same by both methods is consistent with monodispersion of the particles in the aerosol. A typical trial is shown in table 2.

Of the deep-bed materials, clean single-thickness pads of Filterdown 50-FG ordinarily retained 98.5 to 98.7% of freshly nebulized bacterial aerosols. Impinger samples confirmed the 99% retention reported by Decker and his group for the same medium. However, one substandard lot was received which passed up to 15% of droplet nuclei. This was returned to the manufacturer, who confirmed the poor performance of the sample and stated that steps had been taken to prevent release of substandard lots in the future. Single-thickness pads of Aerosolve 95, a deep-bed medium of considerably lower resistance to air flow than Filterdown 50-FG, showed an average retention of 95% with a range from 89 to 98.5% in different runs. Retention of droplet nuclei by dust-laden filters was higher than by clean filters. Both mediums retained essentially 100% of bacteria-bearing dust particles produced by the powder blower. It is reasonable to assume that any medium retaining 90% or more of an aerosol of droplet nuclei would retain essentially 100% of bacteria attached to atmospheric dust particles.

Unlike absolute filters deep-bed filters are not individually guaranteed as to their efficiency by the manufacturer. This fact suggests the need for testing the performance of individual filters used in critical situations, especially in view of the variation we have observed in different lots of deep-bed material.

Penetration of the glass and glass-asbestos papers by droplet nuclei was roughly in proportion to their DOP ratings. The high retention of these mediums was achieved only at a resistance to air flow significantly greater than that offered by the deep-bed mediums. A cotton surgical face mask retained less than 20% of staphylococcic droplet nuclei.

Field Studies

Because of abnormally high bacterial counts in the operating rooms, a survey of the two operating suites was undertaken. With use of titanium tetrachloride as an indicator it was determined that air from the corridor was being drawn into each of the four eye operating rooms and exhausted through ceiling ports in the scrub rooms and anesthesia rooms. When the doors to the corridor were closed a brisk flow of air under them into the operating rooms was apparent. The air flow at either end of the main corridor of the operating suite was then tested, and it was found that air was being drawn under and between the double doors which opened into the main stair well of the hospital at one end of the corridor and into the ear, nose, and throat outpatient clinic at the other. A similar situation was encountered in the ear, nose, and throat operating suite on the floor above.

A survey by ventilating engineers confirmed these findings. It was brought out that the air-supply fans had been slowed in order to reduce the intake of outdoor dust through viscous panel filters. At the same time exhaust fans in the anterooms continued to operate at their original speed, so that a negative air pressure was created in the operating rooms. The parallel between this situation and that reported by Blowers and co-workers[12] is striking.

In accordance with the consultants' recommendations the exhaust ports were sealed off and fan speeds increased to the maximum, 1,700 revolutions per minute, creating a positive pressure in the operating rooms. Air escaped by exfiltration under doors and through louvers into surrounding areas. The total air flow thus provided was between 500 and 600 cu. ft. per minute for each operating room, with 100% outside air, providing about 12 air changes per hour. Viscous filter panels in the intake ducts for outside air were supplemented by banks of deep-bed glass-fiber filters (Aerosolve 95) in the distribution ducts to each operating room.

TABLE 3.—*Performance of New Filters to Operating Rooms Against Nebulized Staphylococci**

Room	Colonies per Cu. Ft.		Efficiency, %
	Upstream	Downstream	
1	5,400	160	97
2	3,600	170	95
3	2,400	170	93
4	8,000	228	97

* Pressure drop: 0.24-in. water gauge; 15-min. trials at 2 liters per minute.

In order to test the efficiency of the completed installations, samples were taken from the ducts at suitable locations upstream and downstream from the banks of filters while freshly nebulized and dry dust aerosols were being introduced through openings in the duct wall into the air stream from the supply air fan. The first tests showed penetration of the order of 50%. The fault was traced to defective installation and token calking of the cadmium-plated filter frames in the ducts and to omission of the tie-rods used to seat the filter cartridges firmly against the felt gaskets in the frame. This omission was contrary to the manufacturer's specifications. In one instance the metal-tapping screws used to fasten the water gauge manometer to the duct wall had forced the filter frame inward away from the duct. After correction of these deficiencies, retention of the order of 95% was found for droplet nuclei (table 3). The effect of ventilation on the concentration of droplet nuclei (Staph. albus) nebulized into an operating room is shown in figure 2.

Comment

Selection of a filter for a given purpose represents a compromise between high efficiency and low pressure drop (inversely reflecting power cost) and service life.[13] For air supplied to hospital operating rooms, delivery rooms, and nurseries, this compromise must be resolved in terms of the expected microbiological and particulate challenge to the filter and the efficiency of cleaning required of the filter against the expected challenge.

The state of bacteria and molds in outside atmospheric air is not entirely clear. Colebrook and Cawston[14] found a preponderance of nonpathogenic bacteria and molds with occasional colonies of Staph. aureus in air sampled on the roof of their hospital. There was no way of telling whether these organisms were free-floating or attached to dust particles. The infrequency of the common human respiratory pathogens in their samples suggested that few bacteria existing as droplet nuclei survive drying and exposure to atmospheric conditions out of doors.

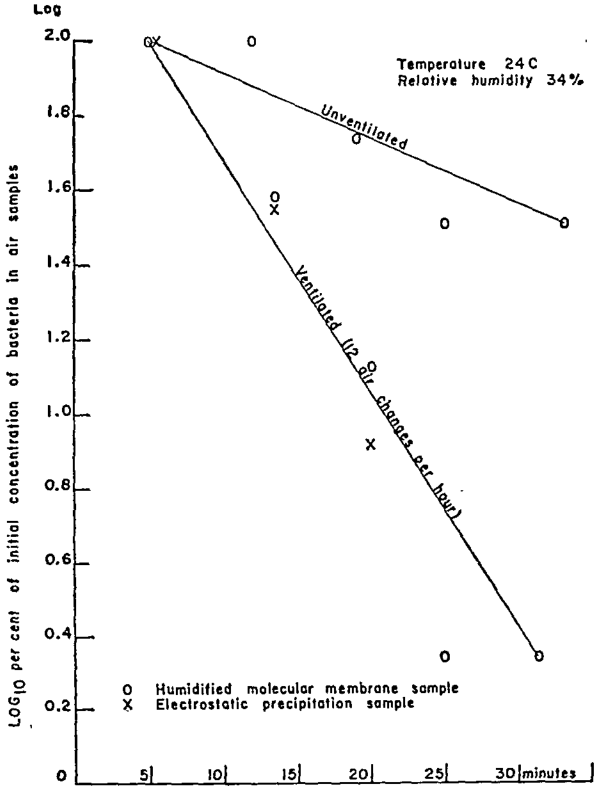

Fig. 2.—Rate of disappearance of Staphylococcus albus from ventilated and unventilated rooms.

The efficiency of the deep-bed mediums Filterdown 50-FG and Aerosolve 95, together with a high rate of flow at a low pressure drop across the filters, renders them acceptable for filtration of ordinary atmospheric air supplied to critical hospital areas. The high pressure drop across the absolute and semiabsolute mediums would make their use appear uneconomical for air supplied to spaces in which human beings are continuously liberating organisms from their persons.

No filter medium can be better than the tightness of its installation. As air seeks the path of least resistance, the volume of air bypassing a loosely installed filter bank will increase with the build-up of dust in the filter bed. At the same time, low manometer readings may give the erroneous impression that the filter bed is operating well below its maximum permissible pressure drop, when actually the reverse is the case.

Unlike a plumbing installation a faulty air filter assembly shows no immediate sign of leakage. Because the load of particles entering the air intake during any short period of time is small, dust and bacteria may accumulate before spilling over into a channel. If alternate moisture and drying exist at an upstream location, bacteria which have proliferated during the moist phase may strike the filter face en masse during the dry phase. Detection of leakage would thus depend on prolonged sampling, fortuitous sampling during a period of spillage, or performance tests using a standard challenge of dust or bacteria.

Neither the contractor nor the consulting engineer carried out a performance test of the filters installed in the ducts leading to our operating rooms. Moreover, the consultant failed to detect the contractor's failure to meet the manufacturer's specifications for installing the filters. No hospital should accept an installation which has not been found to retain at least 85% of atmospheric dust or its equivalent. Ventilating engineers should be prepared to certify the initial performance of any high-efficiency filter system and to spot-check any sample of fibrous medium for substandard efficiency.

A correctly installed bank of deep-bed glass-fiber filters protected by suitable viscous or electronic prefilters requires remarkably little maintenance. After six months of continuous (24-hour) operation, the pressure drop across the filters for our operating rooms had risen from 0.25 to 0.42 in. of water (maximum allowable dirty drop is 0.8 in. of water). Other advantages include disposability, ease of replacement, and retention of dust during filter changes. Heavy particles on the duct floor should be removed by vacuum cleaning at the time of filter changes.

The ceramic paper is intended for high-temperature dust filtration and would not normally find an application in hospital ventilating systems. The absolute mediums, because of their higher resistance to flow, are not ordinarily used in air supply systems for hospitals.

The glass-asbestos paper (Micretain) is stated by the manufacturer to be suitable for use in supply systems to operating rooms. A cartridge presents 200 sq. ft. of pleated filtering surface and permits an air flow of 1,000 cu. ft. per minute at a clean rated pressure drop of 0.4 in. water gauge. Because of its higher efficiency, greater uniformity, and longer service life (4,000 hours with adequate prefiltration) the manufacturer believes that this will be an economical filter for critical hospital air supply situations.

The excellent retention rate of several fibrous filters suggests the desirability of designing ventilating systems to permit partial recirculation of air. The advantages of recirculation in permitting easier and cheaper control of temperature and humidity are obvious, especially where explosive vapors are not in use. Even when volatile agents are being used Thomas[15] feels that the present requirement of 100% outside air is unreasonable and that 50% recirculation would be perfectly safe at the same relative humidity.

In ordinary ventilating situations the need to sterilize fibrous filters in place does not arise. If it became necessary to sterilize a heavily contaminated exhaust filter this could be done with beta-propiolactone in the vapor phase[16] or with ethylene oxide in suitable combination with an inert gas.

The high efficiency of Filterdown 50-FG permits other applications in the field of air filtration. At the suggestion of Snow[17] this material has been employed as a tertiary filter in an industrial vacuum cleaner (Kent Quiet Junior) which is suitable for use in hospitals. At a volume output of 135 cu. ft. per minute and at an air velocity of 210 ft. per minute through the medium, a single-thickness pad of Filterdown 50-FG placed upstream from the twin motor intakes retained 99.8±0.2% of nebulized staphylococci either alone or in conjunction with the normal primary (paper bag) and secondary (cloth bag) filters of the machines. The higher efficiency observed at the higher velocity is consistent with arrest by inertial impaction.

The low resistance to air flow of Aerosolve 95 and 85 suggests a possible application in surgical masks. We are currently exploring the use of these materials as a better means of checking bacteria of respiratory tract origin at their source.

Conclusions

A supply of clean air cannot by itself eliminate infection, but a supply of unclean air cannot be tolerated in a hospital. Adequate cleaning of air by filtration through efficient fibrous mediums or by electrostatic precipitation is mandatory for operating rooms, delivery rooms, and nurseries. Performance testing of any installation for high-efficiency fine filtration is essential. If an electronic air cleaner is used, incorporation of an efficient fibrous filter between it and the space being ventilated is essential. Two deep-bed glass-fiber materials were found to provide absolute filtration of bacteria on dust particles and high retention of bacterial droplet nuclei. A glass-asbestos paper intended for hospital use offered retention in the same range.

200 Beacon St. (16).

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POISONOUS SNAKE BITES

REPORT OF A CASE

Thomas McCreary, M.D.
and
Harold Wurzel, M.D., Philadelphia

A 39-year-old man was bitten on the back of the hand by a rattlesnake (Crotalus adamanteus) 122 cm. in length. Immediate treatment consisted of suction and application of a tourniquet. Subsequent alarming symptoms were treated by multiple incisions; hypodermic injections of an antivenin; sedation with phenobarbital sodium; venoclysis with sodium chloride, dextrose, and calcium; administration of penicillin and streptomycin; transfusion of whole blood; and the oral administration of atropine, antacids, and diphenhydramine hydrochloride. Systematic observations on the blood-clotting mechanisms showed that clotting could not be induced and fibrinogen was completely absent three hours after the bite. All figures relating to coagulation were normal one day, five days, and six days after the bite, but the patient was not free from symptoms of serum sickness and other complications until the 12th day.

There are 2,500 species of snakes in the world, but less than 200 of them are poisonous to man.[1] In the United States at least 35 species and subspecies of poisonous snakes are known. Estimates on the incidence of snake bite in this country range as high as 3,000 per year,[2] but the death rate from snake bite is low—perhaps 10 or 20 per year.[3] Poisonous serpents are found in 47 of the states, Maine and Alaska being the exceptions. Most of the fatal bites occur in the South and Southwest, where there are more snakes and conditions favor greater exposure. With the increasing popularity of camping and other outdoor activities, there is a possibility that victims of snake bite may become more numerous and the geographical incidence more widespread. Recently we had the opportunity of treating a victim of snake bite. It is incumbent on every physician, regardless of his location, to be prepared for such an emergency.

Report of a Case

A 39-year-old zoo keeper was bitten on the back of the right hand by a 4-ft.-long diamondback rattlesnake (Crotalus adamanteus) on April 23, 1958. Within 10 minutes an incision was made at the bite site and a tourniquet applied at midforearm. The victim sucked at the wound while he was rushed to the Hospital of the University of Pennsylvania, arriving there about 30 minutes after the accident. By this time his hand and forearm were intensely swollen and there were patchy areas of ecchymosis. It appeared that only one fang had penetrated the skin between the third and fourth metacarpal heads on the dorsum of the hand, but there were several other lesser teeth marks. Despite severe swelling and discoloration of his hand, the wound was only moderately painful.

The tourniquet was moved higher on his arm, and the wounds were opened wider. Additional incisions were made on the forearm at the edge of the swelling. Five ampuls of antivenin were injected into the hand and at various levels up his arm. During these procedures the patient first began to manifest evidence of systemic reaction. He began to perspire freely and to complain of perioral numbness that made speaking difficult. Coarse muscle twitches and fasciculations began in his chin and neck and gradually spread to involve virtually all muscle groups. Cyanosis of the lips and tongue was noted. He began to vomit and did so repeatedly for approximately eight hours. Phenobarbital sodium was given parenterally, and his condition was maintained with intravenous administration of dextrose and saline solution, to which was added calcium gluconate in an attempt to control the twitching. Penicillin and streptomycin therapy was instituted.

Saline compresses were applied to his wounds. He was given 500 ml. of whole blood because of continuous ooze from the wounds. Coagulation studies done three hours after admission indicated afibrinogenemia. Fibrinolysins were not found. Because there was no evidence of bleeding except from the sites of the wounds, administration of fibrinogen was withheld. Within 24 hours his clotting functions were almost normal.

The initial hemoglobin value was 13.7 Gm. per 100 ml. Urinalysis disclosed 3+ proteinuria and urine was otherwise free of abnormalities. At no time was there evidence of hemolysis such as hemo-

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Assistant Instructor in Medicine and fellow in hematology, Medical Clinic (Dr. McCreary), and member, William Pepper Laboratory of Clinical Medicine (Dr. Wurzel), Hospital of the University of Pennsylvania.

globinemia or jaundice. Red blood cell osmotic fragility was normal. The stool was negative for occult blood.

During his first 24 hours in the hospital, the patient was given an additional 5 ampuls of antivenin, making a total of 10. On the day after admission his hemoglobin level was 10.8 Gm. per 100 ml. and it was assumed that the fall was due to bleeding from the wounds. His systemic symptoms then were abating, and he was able to take nourishment by mouth. The muscular twitching ceased 48 hours after admission. He had moderate fever with peaks to 101 F (38.3 C). Four days after admission his reticulocyte count was 5.2%. The next day the hemoglobin level dropped to 9.6 Gm. per 100 ml. and he developed more fever with elevations as high as 104 F (40 C). At this time his stools gave a 4+ guaiac reaction. Generalized lymphadenopathy became apparent, and he developed an urticarial rash that became confluent and involved almost his entire body. His white blood cell count rose to 11,900 per cubic millimeter with 8% eosinophils. The gastrointestinal bleeding was treated with transfusions and administration of atropine, milk and cream, and antacids. He received only diphenhydramine (Benadryl) hydrochloride to combat the serum reaction. Steroids were avoided because of the gastrointestinal bleeding.

On April 30, seven days after admission, a gastrointestinal series showed changes suggestive of postbulbar ulcer. Late that evening he vomited some coffee-ground material and his abdomen became distended. His stomach was emptied by means of a Levin tube, and feedings were continued after discontinuing the large doses of atropine. The next morning the distention was no longer present and he felt much better. On the 10th hospital day his fever began to abate and he showed rapid subjective improvement. His stools became negative for occult blood. The wounds on his right hand and arm were healing rapidly. On the 13th hospital day the gastrointestinal series was repeated and was interpreted as normal. He had been afebrile for 48 hours when discharged on the 14th day.

Coagulation Studies in Patient with Snake Bite

Test	Normal Values	Results (After Bite)			
		3 Hr.	24 Hr.	5 Days	6 Days
Clotting time, min.	12-20	No clot in 36 hr.	12	13	10
Prothrombin consumption, sec.	15 greater than Quick 1-stage prothrombin time	No clot	25.5	22.2	36.1
Clot retraction	Good to excellent	No clot	Good	Excellent	...
Recalcification time, sec.	150-270	No clot	240	300	180
Quick 1-stage prothrombin time, sec.	12-14	No clot	14.2	13.4	13
Labile factor, %	More than 50% of control value	40	92	82	72
Stable factor	More than 50% of control value	No clot	Normal	Normal	Normal
2-stage prothrombin time, %	...	77	100	100	100
Fibrinogen level, mg. %	250-400	0	...	...	...
Fibrinogen index (Fibrindex), sec.	5-10	No clot	12	5.4	4
Platelet count/cu. mm. (Rees-Ecker)	150,000-350,000	177,000	...	140,000	130,000
Thromboplastin generation	...	...	Normal	Normal	...

Coagulation Problems

The initial coagulation studies in our patient (see table) suggested that the main defect was afibrinogenemia. All of the abnormalities noted could be explained by the fact that fibrinogen was absent from the blood. We were unable to demonstrate fibrinolysins in the original sample of blood taken three hours after the bite. When added to normal blood or to a 1% solution of fibrinogen, a clot formed, though the clotting process was delayed. When Vipera russelli venom was used as the source of thromboplastin no clot was obtained. This venom will normalize the abnormal prothrombin time if a patient is deficient in proconvertin.

To ascertain the in vitro effects of Crotalus venom on normal oxalated plasma (nine parts of blood to one part of potassium oxalate), lyophilized venom was diluted with saline solution and equal parts (0.2 ml.) of this solution and the plasma were tested. Clotting times were 5 seconds with 1 mg. of venom per milliliter, 64 with 0.2 mg., and 100 with 0.1 mg. Recalcification time of the substrate plasma was 270 seconds. Thus, the venom clotted the oxalated plasma directly without the addition of calcium ions or other factors. It is therefore confirmed that the Crotalus venom converts fibrinogen to fibrin without other factors, as does thrombin.

We believe the thrombin-like activity of the venom eventually led to defibrination of the blood with the resultant incoagulability. The deposition of the fibrin clots must have been in silent areas, for no evidence of thrombosis was found clinically.

Comment

Most of the poisonous snakes in the United States are pit vipers or Crotalidae. These include the numerous species of rattlers (genera Crotalus and Sistrurus), the copperhead (Agkistrodon mokasen), and the cottonmouth or water moccasin (

piscivorus). The coral snake (family Elapidae, genus Micrurus), endemic to the southern states, is related to the cobra and is not a pit viper. All the Crotalidae are front-fanged serpents, generally nocturnal in their habits, and usually capable swimmers. They are equally dangerous on land or in water. They are not aggressive and strike usually only for food or in self-defense.

A number of factors affect the gravity of a snake bite.[4] The age and size of the victim are important. Very young and very old persons are more susceptible to serious aftermath. A bite is less dangerous on an extremity and in tissues where absorption is poor. Bites near vital organs are more dangerous. Intravenous envenomation may result in sudden death.[5] The degree of penetration may vary with the amount of clothing worn, the motion of the victim, and the condition of the snake's fangs. Even the heaviest protective boots and shoes do not always prevent envenomation. Generally, the larger snakes are more dangerous because they are capable of injecting greater quantities of venom. Snakes are likely to carry pathogenic micro-organisms in their mouths, most commonly the clostridial organisms of tetanus and gas gangrene. The initial emergency first aid can alter the outcome of a snake bite. If possible, the snake should be accurately identified. Bites from nonpoisonous snakes usually produce superficial scratches, and far less drastic therapeutic measures are required.

The venoms of poisonous snakes consist of complex proteins, enzymatic in nature. They vary in potency from species to species and within a single species, depending on the habits and physical condition of the snake. The amount injected may be from a few drops to 2 ml. per strike. The larger rattlers may inject up to 500 mg. of solids in a single ejection, the water moccasin up to 200 mg.[2] Most venoms contain hyaluronidase, which enhances the rapid spread of venom via the superficial lymphatics.[6] The deeper lymphatics become involved proximally, i. e., at the knee, groin, and axilla. Virtually none of the venom is disseminated via the blood.

The toxic parts of all snake venoms fall into three main categories: proteases, phosphatidases, and neurotoxins.[2] The proteases produce destructive effects at the bite site and play a role in remote visceral hemorrhage. The venom of some snakes (e. g., most rattlesnakes) acts as thrombin, converting fibrinogen to fibrin in the absence of other clotting factors. Others (e. g., Vipera russelli) have thromboplastic activity and convert prothrombin to thrombin.[5] There is damage to vascular endothelium, and fibrinolysis is also frequently seen.[7] The phosphatidases are reponsible for hemolysis. They also alter excitability and conduction in skeletal, smooth, and cardiac muscle. Lysolecithin is formed from lecithin, and this enhances hemolysis and produces hypotension via the release of histamine. Small blood vessels may be destroyed by these enzymes, and capillary permeability is altered. The neurotoxins of coral snakes and cobras may produce a curare-like effect at the myoneural junction, interfere with nerve trunk conduction, or act directly on the central nervous system. Death from neurotoxins frequently is the result of bulbar paralysis.

Coral snake and cobra venoms are chiefly neurotoxic, unlike the rattlesnake venoms which contain little neurotoxin, though there are exceptions. All venoms hemolyze blood, but red blood cell lysis is rarely complete, even with high titer venoms. There tends to be an inverse relationship between lethal toxicity and the ability to produce local necrosis.[8] The hyaluronidase of venoms is not of itself toxic. It is antigenic, however, and specific antiserum inactivates it.[6]

Treatment

The treatment of snake bite is more effective the earlier it is started. Since most bites occur in areas remote from a physician's office, the victim himself must usually apply the first aid. If he can remain calm, he will not only work more efficiently but will reduce the speed of systemic spread.

The first step, application of a tourniquet, has been an acceptable procedure for many years. However, recent investigations have cast doubt on the efficacy of this maneuver. The objective was to occlude the superficial lymphatics so as to lessen systemic diffusion of venom. It is thought by some that occlusive bands intensify local tissue destruction without preventing spread of the toxins.[9] Incision and suction at the bite site is another time-honored procedure no longer utilized by some physicians with extensive snake bite experience. On the other hand, Jackson and Harrison [10] offered rather convincing evidence that early suction results in removal of large quantities of venom. If this method is used, incisions need be made only to the depth of the subcutaneous tissues and suction begun by mouth, suction bulb, or whatever else is available.[11] The venom is harmless when taken orally unless there is a break in the mucosa. As swelling extends beyond the site of envenomation, short linear incisions may be made at the edge of advancing swelling and suction applied over the incisions. If the bite is on a limb, a series of incisions may be made to encircle the limb. If a tourniquet is used, it should be moved proximally in advance of the swelling and applied lightly enough that arterial blood flow is not compromised.

While extensive local excision has been advocated,[12] in most cases this would seem unnecessary unless obvious necrosis or severe infection is present. The use of ice packs and other cooling measures has met with some favor. This appears to lessen necrosis, to slow absorption of venom, and to prevent extensive tissue loss.[11] However, it is not universally accepted as a method of treatment.[14]

Unquestionably, snake bite victims often survive without the use of antivenin.[15] Deferring its use, however, presupposes considerable knowledge and experience in snake bite, which most physicians do not have. Hence, if there is any reason to believe that the bite may be serious, antivenin should be used, after first taking the precautions routinely advised before administering any horse serum preparation. The antiserum commercially prepared as antivenin (Crotalidae) polyvalent (North and South American anti-snake-bite serum) contains effective titers against all poisonous American snakes except the coral snake. The dried serum is supplied in a kit containing 10 cc. of sterile water for reconstitution and a disposable syringe that can be used as an aspirating apparatus after the serum has been injected. If kept in the dry state, the serum is stable for at least five years without refrigeration.[16]

The amount of antivenin to be given must vary. A smaller person requires a larger dose because the venom, distributed in a smaller volume, is less dilute. If the patient is seen within two hours of his accident, he should receive half the initial dose in the vicinity of the bite and the other half intramuscularly or subcutaneously in the affected part. A total of one to five vials (10 cc. each) may be used as a first dose. If swelling and necrosis persist and advance, more antivenin may be given every one-half to two hours until the process is arrested. A comatose patient or one in shock may require intravenous administration of antiserum. The possibilities of serious allergic reactions to the horse serum cannot be too strongly emphasized, and these must be anticipated if the treatment is not to be worse than the disease.

Snake bite is always a medical emergency, and every victim should be hospitalized. Blood typing and crossmatching should be done as soon as possible, because toxins from the snake bite may later render this impossible. Frequent blood cell counts and urinalyses are required for early detection of hemorrhage and hemolysis. The possibility of visceral or cerebral hemorrhage must be kept in mind. It may be possible to uncover a coagulation defect that would respond to specific therapy. Afibrinogenemia, if attended by massive bleeding, may require infusions of fibrinogen to control the bleeding. Most victims will be unable to take fluids orally because of vomiting. Intravenous infusions of dextrose and saline solution should be started to maintain hydration. In the event of severe hypotension or shock the patient should be given transfusion with whole blood and vasopressor agents used as indicated. Calcium gluconate may be given in the infusion to counteract unpleasant muscular twitching. Antibiotics probably should be used regularly because of the threat of infection. The routine use of tetanus and gas gangrene antitoxins has also been advocated. Antihistaminics may be useful in counteracting the effects of the histamine that is released by some venoms. Generally, the patient is thought to be out of danger if he survives the first 48 hours. Relapses occur rarely and are often due to infection or gangrene. Amputation may occasionally be lifesaving if tissue necrosis is extreme. In any case, careful, prolonged follow-up study is necessary.

Summary

In a case of rattlesnake bite with survival, afibrinogenemia occurred as a result of the thrombin-like action of the venom. Gastrointestinal bleeding and serum sickness also developed.

3600 Spruce St. (4) (Dr. McCreary).

Louis Spitz, M.D., and Mr. Roger Conant (Curator of Reptiles, Philadelphia Zoological Garden) assisted in this study.

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The lyophilized venom used in the coagulation experiments was supplied by Mrs. Eleanor Buckley, Wyeth Laboratories, Inc., Philadelphia.

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MEDICAL CARE UNDER THE HEALTH INSURANCE PLAN OF GREATER NEW YORK

Edwin F. Daily, M.D., New York

House, office, and in-hospital care under the Health Insurance Plan is provided to 550,000 persons by physicians who work almost exclusively in groups. The 32 groups operate medical centers in which more than 10 million dollars have been invested. Qualifications of group physicians are determined by a medical control board, and professional education programs for group members are provided. The quality of surgical, medical, obstetric-gynecologic, pediatric, laboratory, and x-ray services has been thoroughly evaluated, and the other departments are currently under review by specialists outside of the plan. Each medical group receives equal annual capitation for each insured person selecting that group, and each group operates its own plan of paying its distributable income to physician members. The accumulation of experience is enabling the organization to move steadily in the direction of comprehensive medical care of high quality.

Innumerable inquiries have come to the Health Insurance Plan of Greater New York (H. I. P.) from practicing physicians, medical students, health insurance organizations, medical societies, labor unions, and others asking about the plan. This paper has been prepared to help answer some of the often-raised questions.

The Health Insurance Plan of Greater New York, because it provides medical care and not cash indemnities, is obligated to establish professional standards and to organize its activities so that subscribers will be assured a high quality of medical care. The following standards and methods are among those set by the H. I. P. and developed by it to achieve this quality.

Group Practice

Home, office, and in-hospital medical care in the H. I. P. is provided to 550,000 persons by physicians who work in groups (except for 1.7% of the enrollees who live outside of the areas in the seven counties served by the 32 medical groups). Group practice has been defined by the H. I. P. as "provision of preventive, diagnostic, and curative medical services by family physicians, specialists, and other professional and technical staff working as a team in a group center, pooling their knowledge, experience, and equipment, as well as income." The scope of medical care provided by the H. I. P. is shown in the table.

The founders of the H. I. P. believed that the close professional association of physicians in group practice at adequate medical centers would inevitably result in better medical care than could be provided by physicians working alone. One of the major reasons physicians become associated with medical groups in the United States, they say, is that they believe it will enable them to practice better medicine.

All group physicians must meet the professional standards established by the H. I. P. medical control board, as will be discussed later. Each family physician in a group has readily available to him, and without additional cost to his patients, the serv-

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Vice-president, Health Insurance Plan of Greater New York.

ices of specialists in all of the clinical fields (medicine, pediatrics, surgery, obstetrics-gynecology, orthopedics, ophthalmology, otolaryngology, dermatology, urology, neurology, radiology, pathology, and psychiatry), as well as in the laboratory, x-ray, and physical therapy departments. (Each medical group has a psychiatrist who provides psychiatric diagnosis and consultation. The H. I. P. coverage does not provide for psychiatric treatment by psychiatrists.) The 32 medical groups have over 1,000 physicians; approximately one-half are family physicians and the other half specialists. Most of the group physicians (80%) are partners. The new group physicians start under contracts. Each medical group elects its own medical director and establishes appropriate committees. Each clinical department has a chief responsible for supervision and administration of his department in the group. Professional work schedules are arranged in almost all of the groups, or between groups, for emergency night and week-end calls and vacations in order to enable all participating physicians to have free time for rest, research, and study.

Scope of Medical Services Provided by Health Insurance Plan of Greater New York

Services Provided Under H. I. P. Contracts

- General medical, specialist, surgical, and obstetric care
- Laboratory and diagnostic procedures
- Periodic health examinations, immunizations, and other measures for prevention and detection of disease
- Physical therapy, radiotherapy, and other therapeutic measures
- Professional services for the administration of blood or plasma
- Eye refractions
- Visiting nurse service at the insured person's residence as prescribed by a physician of the group
- Ambulance service from the insured person's residence or, in an emergency, from other locations within the area served by the group to a hospital when ordered by a physician of the group

Services Not Provided Under H. I. P. Contracts

- Medical services for acute alcoholism; drug addiction; tuberculosis, during the period that the insured person is confined as a patient in a sanatorium or special hospital or if recommendation for such confinement has been made by a licensed physician and facilities for such confinement are available but have been rejected by the insured person; psychiatric disorders, after diagnosis, for which care is customarily provided by a psychiatrist; chronic illnesses in an institution other than a hospital for general care; artificial insemination; and anesthesia if administered in a hospital or if administered by an approved anesthesiologist in a medical group center
- Cosmetic surgery, except procedures needed for the treatment of congenital anomalies so as to restore a part of the body to its proper function and procedures to correct a serious disfigurement or serious deformity caused by a disease or injury treated during the patient's coverage under the H. I. P.
- Electrolysis for epilation
- Services for dentistry or dental surgery
- Prescribed drugs and biologicals used for prevention or treatment of disease, prosthetic appliances, eye glasses, blood, plasma, and other substances ordinarily provided by donors
- Special duty or private nursing service

Utilization of Services by Insured Persons (1957)

- 75% of all enrollees receive medical service during a year; average number of medical services received by all enrollees per year is 5.36, with a high of 15.5 services per year for children under 1 year of age and a low of 3.7 services per year for those between the ages of 15 and 20; 80% of all medical services are provided in physicians' offices, 9% in patients' homes, and 11.3% in hospitals
- Breakdown of number of physicians' services per 100 enrollees per year, as provided by type of physician:

Family physicians and internists	268
Pediatricians	60
Radiologists	44
Obstetricians-gynecologists	42
General surgeons	27
Allergists	21
Ophthalmologists	19
Orthopedists	16
Otolaryngologists	14
Dermatologists	14
Urologists	8
Other	4

Ages of enrollees

- 28.4% under 15 years
- 15.5% over 55 years

Cost

- The premiums for group enrollment are $42.72 per year for one person, $85.44 for a man and wife, and $128.16 for a family with children. These rates are 21% higher if the income of an individual subscriber is over $6,000 per year or if family income is over $7,500 per year. (All subscribers must also carry hospital insurance at the time of enrollment.)
- The average premium income per insured individual is approximately $36 per year, varying each year in relation to the number of children in families since the premium is the same for a family with one or with several children and varying with the percentage of enrollees in the upper income rate.
- Under New York State law, 4% of the premium income is placed in legal reserves until a reserve of 25% of premium income is reached. Of all premium, 88% is paid to the medical groups. The remainder covers the H. I. P.'s costs of maintaining its medical department, research, statistics, and general administration.

Since each subscriber has his choice of any medical group serving his community and then, within the group chosen, makes a choice of a family physician, there is healthy competition among groups to provide the best possible medical care. Each medical group has learned that its economic future depends on how satisfied its own subscriber-patients are, for subscribers are soon aware of inadequacies in physician attitude or administrative procedure.

The Medical Group Centers

The 32 medical groups affiliated with the H. I. P. have invested over 10 million dollars in medical centers. Each medical group is required to have a center with the following facilities: 1. Sufficient consulting and examining rooms to provide all ambulatory specialty services without delay in appointments. Because of the large geographical areas now covered by most of the medical groups, many family physicians and pediatricians also provide services in offices nearer the homes of their subscriber-patients. However, these physicians also have scheduled hours set aside each week for appointments at the center. 2. A fully equipped clinical laboratory with trained technicians under the supervision of an approved pathologist. 3. An x-ray department with trained technicians under the supervision of an approved roentgenologist. 4. A physical therapy department with at least one licensed physical therapist and equipment for the usually accepted modalities of treatment. 5. Equipment for electrocardiography, basal metabolic rate determination, and similar procedures. 6. Uniform medical record systems.

It is our experience that, whenever physicians are brought together to work in one center and share modern equipment and facilities, the ease of consultation and the stimulation of professional contact bring about the desire and effort to achieve and maintain high levels of performance.

Qualifications of Physicians and the Medical Control Board

Prior to participation in the work of the medical groups, all physicians have their training and experience reviewed and approved by an impartial medical control board composed of 18 leading physicians, the majority of whom are not affiliated with the medical groups. The contracts between the Health Insurance Plan and the 32 medical groups require that the groups and their physicians abide by the policies and regulations adopted by the medical control board.

Examples of standards of training and experience adopted by the medical control board are as follows: (1) for chiefs and associate chiefs of all of the 12 basic specialties, certification by the American board in the respective specialty and appointment as attending, associate, or assistant attending physician on the staff of a hospital approved by the American Medical Association for resident training in the specialty; (2) for assistants in each specialty, completion of training required by the respective American boards; (3) for family physicians (several of the medical groups employ as family physicians only diplomates of the American Board of Internal Medicine or physicians who have completed the training required by this board), graduation from a medical school approved at the time of graduation by the American Medical Association, an internship for a period of at least one year in a hospital approved for internship by the American Medical Association, a residency or fellowship in internal medicine for a period of at least two years in a hospital approved by the American Medical Association for residency or fellowship in internal medicine (adopted June, 1957) or a staff appointment in medicine for the five years preceding the date of consideration of the candidate by the medical control board in a voluntary or municipal hospital approved for residency training in internal medicine by the American Medical Association (adopted June, 1957), and appointment in medicine on the staff of a voluntary or municipal hospital approved for residency training in internal medicine by the American Medical Association, personal interview by members of the medical control board regarding training and experience, and a written test in clinical medicine prepared by a national testing organization skilled in this field; and (4) for consultants in specialized fields of surgery (approximately 80) serving all medical groups (cardiac, plastic, brain, thoracic, head and neck, pediatric, stapes, fenestration, and others), certification by the American Board of Surgery, appointment as attending or associate attending physician in the specialized field in a hospital having the personnel and equipment necessary for the proper performance of operations, and demonstrated proficiency in the specific specialized field.

The medical control board requires a base-line history and physical examination for each new adult enrollee as soon as feasible after joining the medical group of his choice. It has established requirements that maternity care be provided by obstetricians and that pediatric care, at least for children under the age of 3, be provided by pediatricians. Some of the medical groups provide care by pediatricians to the age of 6 and some to the age of 12 years.

Professional Educational Programs

Each of the medical groups has monthly clinical staff meetings to discuss case reports, morbidity, and mortality and to review clinical subjects selected primarily by the family physicians. The H. I. P. has an educational fund used to defray one-half of the cost of tuition for postgraduate courses taken by the physicians. A foundation has made available to the H. I. P. funds to pay research fellowships for selected young physicians becoming affiliated with the medical groups.

A consultant specialist in physical medicine is available to the medical groups to discuss regularly how the skills of this relatively new medical specialty can assist in the care of patients requiring rehabilitation. Two consultant dietician-nutritionists have been employed by the H. I. P. to work with the medical groups in developing group therapy for obese, diabetic, or other types of patients in need of special diet discussions and to develop the type of diet instructions most suitable for the population groups served by the medical groups. A maternity nurse-teacher has been employed by the H. I. P.

(with the aid of a grant from the U. S. Children's Bureau) to develop classes for expectant parents in cooperation with the obstetrician-gynecologists in each medical group. A specialist in medical records is employed by the H. I. P. for consultation with the medical groups and individual physicians on all aspects of maintaining acceptable records and for the development of systematized follow-up studies of all patients with serious or potentially serious illnesses who fail to return for needed medical care.

A staff of five full-time consultants in community resources (skilled social workers thoroughly familiar with more than 2,000 voluntary and public agencies related to health and welfare in New York City) are employed by the H. I. P. to assist the subscribers and physicians in dealing with the difficult problems of obtaining appropriate convalescent home care, household aid, admission to mental institutions, appliances for the handicapped, vocational rehabilitation, and other services.

A staff of six full-time, professional health educators is employed by the H. I. P. to assist the physicians individually and in medical groups to discharge their roles as teachers of sound health information and attitudes and as counselors of wise health practice during illness and health. The health educators guide the development of a wide variety of educational activities, all with the sponsorship and participation of the physicians, including periodic bulletins, a variety of subscriber-physician meetings, pamphlets, films, and intimate discussion groups.

Method of Payment for Medical Care and Subscriber Relations

Method of Payment for Medical Care.—The fee-for-service method of payment is not used in group practice under the H. I. P. Instead, each of the 32 medical groups at present is paid $31.80 per year for each person enrolled in a group (this includes $1.20 per enrollee for a pension fund for group physicians). For this capitation the medical groups agree to provide all medical care covered by the contract and needed by their enrollees. After each group has paid its overhead and administrative costs, the income remaining is distributed to physicians on the basis of such factors as number of hours spent in the work of the group, number of years of postgraduate training, and length of time served in the group. Each medical group has its own formula for disbursing its distributable income to its physicians. The security of an assured income and retirement program, the relief from discussing fees and from sending and collecting medical bills, and the knowledge that costs will not deter patient cooperation permit the H. I. P. physicians to be primarily concerned with the provision of good medical care.

Participating physicians are not permitted to make extra charges to or accept payments from or on behalf of the H. I. P. patients for services covered under the H. I. P. contracts, irrespective of the family's income or of the type of services provided, except that they may charge $2 for a home call requested and made after 10 p. m. and before 7 a. m.

Subscriber Relations.—When persons enroll in the H. I. P., every effort is made to acquaint them fully with the services available and how to use them to maximum advantage. They are encouraged to discuss any dissatisfaction with medical services or administration with their medical group directors and to offer suggestions for improvement of the plan. Complaints and suggestions for improvement are discussed by the medical group directors with all of their physicians and staff at monthly meetings.

The H. I. P. maintains a subscriber service division at its central office where written and telephoned inquiries, complaints, or claims from persons and expressions of praise and appreciation are received. Complaints are given careful individual attention and are discussed by the H. I. P. medical staff with the appropriate medical group directors. Copies of all complaints received by the H. I. P. are sent to the appropriate medical groups, and written replies are required. The medical administrative staff of the H. I. P. may find it necessary to interview the persons concerned and to make recommendations for appropriate handling of the complaints. Reviews of all complaints are made by the H. I. P. and are submitted to the medical groups at regular intervals. The methodology of handling any complaint or claim promptly and fairly has minimized malpractice claims.

With the guidance of the H. I. P.'s health education staff, medical groups sponsor quarterly bulletins which are mailed to subscribers and hold periodic night meetings with their subscribers for the purpose of discussing problems related to health and medical group care of interest to subscribers.

These bulletins and meetings, in addition to dealing with such subjects as infant care, mental health, health problems of elderly people, nutrition, and literally many dozens of other health areas, have also dealt with such matters as how a medical group functions, appointment systems, laboratory and other diagnostic procedures, doctor-patient relations, and a wide variety of administrative matters. Several medical groups have developed advisory subscriber committees.

In all instances the fundamental aim is to bring the physicians in a group and its subscribers closer together. The medical director and his administrative staff are involved in the preparation of the bulletin and are always present to lead the discussion and to answer questions at subscriber meetings. Many physicians were at first apprehensive about meeting with large numbers of subscribers, fearful that they would be overwhelmed by unwarranted and intemperate criticism. The results have been quite the contrary.

Complaints are solicited and aired at these meetings, as they are in the bulletins. Many valuable suggestions for facilitating the work of the group in the interest of subscribers have been made at these meetings to the advantage of all concerned. The group directors take immediate steps to bring about any necessary changes and thus avoid future complaints.

The group physicians have learned that properly conducted meetings and carefully written bulletins provide an excellent opportunity to discuss with their subscribers many practical and difficult problems in the provision of good medical care. For the subscribers a feeling of sharing with their physicians in the success of their medical group has been achieved.

The methods described permit all subscribers to have a direct part in influencing the quality of medical care. A favorable attitude of subscribers toward their medical groups or toward their individual physicians is essential for the success of any medical group, for dissatisfied subscribers may readily transfer to another medical group or to another physician within a group.

Studies of the Quality of Medical Care

During the past three years, the H. I. P., with the cooperation of the medical groups, has thoroughly evaluated the quality of surgical, medical, obstetric-gynecologic, pediatric, laboratory, and x-ray services provided in each of the 32 medical groups.[1] This study was made by professional leaders in each specialty field who were not otherwise affiliated with the H. I. P. For each physician studied, the H. I. P. selected a sufficient number of clinical records to evaluate fully the competence of the person. Any physician whose score was unsatisfactory and who remained in the medical group at the conclusion of the study was given individualized educational guidance by his medical group and was repeatedly restudied until his work was satisfactory or he resigned from his medical group. (It was interesting to note, in the pediatric portion of the study, that 95% of all the H. I. P.-insured infants were immunized against whooping cough, diphtheria, tetanus, and smallpox in their first year of life.) As the study of each medical group was concluded, the medical care study team met with the group physicians to discuss fully all of the findings and recommendations for each department and each physician. The departments of orthopedics, urology, allergy, ophthalmology, and otolaryngology are now being evaluated by a new medical care study team.

A recent study by the New York City Health Department and the H. I. P. of the perinatal mortality in New York City showed that the rate for the H. I. P. enrollees (expressed per 1,000 live births and fetal deaths) was 21.3 as compared with 30.1 for all private patients in New York City.[2] Continuing studies are being made for two additional years, including coding in all cases the training and experience of the attending physicians. It is believed that these further studies will show that the difference in the rates is related primarily to the fact that in the H. I. P. only specialists provide maternity care and pediatric care of newborn infants. Other studies are being made of the stage of development of cancer when first diagnosed in the medical groups and the relationship between morbidity in the pregnant woman and the outcome of pregnancy.

Recently a report by the H. I. P. on prepaid medical care and hospital utilization was published by the American Hospital Association.[3] The hospitalization experience of two populations having the same hospital insurance coverage, but different coverage for medical care, was compared in the study. The two populations were those of the H. I. P. and United Medical Service (Blue Shield) in New York City. It was found that the annual hospital admission rate for the H. I. P. population was 77.4 per 1,000 as compared to 94.8 for the Blue Shield group. It was also found that the duration of stay, expressed as the number of days per 100 population per year, was 55.8 days for the H. I. P. and 68.8 for Blue Shield group. There was little difference in the average duration of stay per admission.

The various administrative measures described here reflect a strong desire to provide care of high quality. Of course, the H. I. P. has not met with complete success in its efforts, and some administrative obstacles have arisen. However, the organization has profited, and continues to profit, from its experiences and year by year is moving closer to the complete fulfillment of its goal—the provision of comprehensive medical care of high quality through full-time medical groups with modern medical facilities.

625 Madison Ave. (22).

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A SMALL COMMUNITY HOSPITAL HANDLES A DISASTER

James E. Segraves, M.D., Chicago

Several basic factors appear important in planning a program for handling of mass disaster victims by a small community hospital. The first 24-hour treatment program must be outlined in detail. Team approach is the only logical one, with provision for alternate chiefs. Frequent practice sessions are necessary, and stockpiles of dressings, drugs, aged plasma, and electrolytes must be kept available. In any sizable disaster, the exposed method is the only way to handle burn cases. Identification tags for school children appear desirable. Police should have information about available hospitals in given areas and their casualty capacity. The hospital involved in the situation reported here, a school fire, has 350 beds.

On the afternoon of Dec. 1, 1958, fire broke out in Our Lady of Angels' school in Chicago. Within 15 minutes patients began to arrive at St. Anne's Hospital in Chicago. This is a small community hospital with 350 beds. The way in which St. Anne's Hospital handled this emergency situation is outlined below, demonstrating what can be done if everything and everybody is ready.

The Plan

The disaster plan at St. Anne's Hospital has been under consideration for the past eight years and, in that time, has undergone many changes until it has arrived at its present form. The plan as it has been worked out is voluminous, since it presumes many degrees of disaster from a few assorted victims to the thousands resulting from a nuclear explosion. Its success, in any degree of disaster, depends on many factors, not the least of which is a clear understanding by all concerned of their duties, an adequate stock of supplies ready to be used at a moment's notice, an acceptance by the members of the medical staff of the team plan of treatment, and the presence, in the receiving pavilion, of a man or men capable of rapidly evaluating the nature of the injuries. He must have knowledge of the medical talent available so that the patients may be assigned to the proper departments for immediate emergency care and definitive treatment.

In the long run the plan calls for frequent staff meetings, usually, as in this case, on a daily basis, to bring everyone up to date as to the situation as of that moment, to suggest changes in routine treatment, and to advise the team as to the available supplies. Reports are received from the members of the team and suggestions from the men are solicited and evaluated. Then the plan for treatment for the next 24 hours is outlined.

In other words, until all of the patients are out of danger, care is kept on a 24-hour basis under the immediate and tight control of a team of physicians designated by the staff at the time of the first meeting. The team includes those best suited, in the opinion of the assembled staff, to care for the injured patients, the decision being based on the character of injuries sustained. The meetings must, at all times, be under strict control of the head of the disaster team and/or his designated representatives.

How It Worked

The plan worked in this particular disaster as follows: The emergency room staff notified the administrator of the hospital of the state of disaster, and the administrator called the chairman of the disaster plan, the director of nursing, the director of household activities, the director of nonprofessional personnel, and the switchboard operator (to notify physicians and summon them to the hospital).

The chairman of the disaster plan responded immediately and was informed by the administrator of what appeared to be the extent of the disaster. He assigned men to duties as they reported to the hospital. Cases were noted and provision was made for physicians to care for the following groups: ambulant patients (with instructions to discharge them to their homes if possible), those with minor injuries, those with serious injuries requiring hospital care but no immediate operation, and those requiring immediate surgical care. The chairman of the team and men designated by him evaluated the patients as they were admitted and directed that they be taken to the previously designated centers, depending on the character of the case, as noted above. Centers would vary according to the size and character of the disaster and available facilities.

As soon as all of the patients were evaluated and disposed of, the chairman proceeded to conduct rounds of all the various treatment centers to see that all was going well and to offer suggestions where indicated. These rounds were repeated time after time until all of the patients were put to bed and therapy started. The chairman then called a meeting of the men present to receive reports and outline the first 24 hours of care according to the problems at hand and to designate the team to be responsible for carrying out such care.

Director of Disaster Plan, St. Anne's Hospital.

The director of nurses mobilized all nursing personnel and put in a call for volunteers and off-duty personnel. She assigned nurses, according to the plan, to the emergency room, emergency wards, surgical services, and the various floors; the duty in the latter was to make rooms ready to receive patients as soon as they received appropriate emergency treatment. This was done under the direction of physicians previously so designated and assigned.

The housekeeper set up tables of supplies in operating rooms, in the emergency receiving pavilion, and in the various treatment centers as planned. These supplies, at this hospital, are on hand to care for at least 50 patients, with more available for use in a relatively short time. The pharmacy prepared a list of the drugs available and consulted with the chairman of the disaster committee to determine whether any additional amounts of such drugs or other drugs would be needed. A report as to the available supplies of colloids, including whole blood, was given to the disaster chief, who estimated the amount that would be needed for the first 24 hours. Supplies of electrolytes were checked to assure sufficient quantities for the first 24 hours.

The director of nonprofessional personnel dispatched persons to attend the entrances to the hospital and direct visitors to the proper areas, families of possible injured being referred to a lounge previously designated as the relatives' lounge, where they were registered for identification. He personally communicated to the families the periodic reports as to the identity of injured persons in the hospital as soon as it was possible. All telephone inquiries were directed to a person so designated, and members of the press were directed to the director of public relations. Periodic lists of families and patients were made up by the medical staff secretary, and communication with other hospitals was maintained to locate relatives. The administrator of the hospital coordinated all of these activities and enforced decisions of the disaster team.

How Patients Were Handled

Physicians, including the disaster chief, began to arrive within 15 minutes after the arrival of the first patient, and within 40 minutes 80% of the staff was present and assigned to treatment centers. The receiving pavilion was empty within one hour and 15 minutes, except for six patients who were dead on arrival and had been placed in a previously designated room and four other patients apparently beyond medical help who died soon after their arrival.

Within two and one-half hours all 46 patients were in bed and given care for their burns. Administration of fluids had been started, sedatives, tetanus antitoxins, and toxoid given, Foley catheters inserted, and, in most cases, definitive care instituted. There were, in addition to the burns, a multiple list of other injuries, and definitive care given immediately included two tracheotomies, a screw in the olecranon process for skeletal traction to a supracondylar fracture of the humerus, a Steinmann pin in the os calcis for a fracture of the femur, five moulded plaster splints for fractures of the os calcis, manipulation, reduction, and casting of three Colles' fractures, manipulation and reduction of one fractured tibia and cast, and the application of Crutchfield tongs for traction on a dislocated cervical spine. Other injuries included basal skull fractures (at least two patients), compression of the lower dorsal and lumbar regions of the spine, fracture of the pelvis (six), fracture of facial bone (two), fracture of the spinous process of the vertebral bodies (one), fractures about the ankle (four), fracture of neck of the humerus, and tension pneumothorax for which water seal drainage was started. A Bennett positive-pressure machine was used in two cases.

At the first meeting, held at 8 p. m., the over-all management of the patients was assigned to two pediatricians and one internist. The care of the children's burns, in the initial stage, was assigned to the orthopedic department, and at their suggestion the exposure treatment was decided on for all patients. These decisions were approved by the members of the medical staff present. At the initial meeting it was suggested that Stryker frames be secured, and within 16 hours these were being used in 14 cases. Shock was treated with dextran, plasma, and whole blood and also isotonic sodium chloride solution and lactated Ringer's solution, replacement being made on the basis and the character of the loss; for instance, replacing blood with blood according to the Brooke formula. Chlorothiazide (Diuril) and lyophilized urea were given where indicated. Antibiotics were given immediately, penicillin-dihydrostreptomycin (Combiotic) the first 24 hours and then specific antibiotics as indicated by sensitivity tests. Large quantities of bacitracin and polymyxin-B, and also ristocetin (Spontin), were used with no complications.

The burns themselves were second-degree and third-degree in most cases. The extent of burns was 60% or more in six children, with 90% in one and 80% in one. The rest were burned for varying degrees up to 40%, and four had third-degree burns of the face, including the eyelids, hair, and scalp. Six others had involvements of the ear but not the eyes. Eschars were formed in the first 48 hours. Débridement and skin grafting were first started on the 15th day after patients were admitted. Of the 46 patients admitted, one died early in the second week of a basal skull fracture and septicemia. A second died in the third week of overwhelming bacteremia. In the latter patient, at autopsy all of the vital organs were found to be riddled with abscesses. In those few patients in whom urinary output was temporarily interrupted it was resumed within 12 hours with no further difficulties. Ten of the patients developed bacteremia but recovered satisfactorily, except for the two as noted. The remainder of the patients progressed satisfactorily, and all but 10 of the remaining 44 had been discharged from the hospital by the end of the fourth week.

The skin grafting was under the direction of the surgical department, and autografts were used where available but, in at least three of the patients, lyophilized homografts supplied by the Department of the Navy were used as temporary dressings. At the débridement and skin grafting stage, an aerosol spray containing a 1% solution of neomycin and bacitracin was used with excellent resuts.

What Went Wrong.—Identity was often incomplete, and even parents were unable to identify for sure some of the more severely burned children. A system of multiple tagging on admission would benefit those concerned with seeking victims and reuniting them with relatives. Physicians and other personnel, including volunteers, had difficulty getting to the hospital because of the crush of automobile and pedestrian traffic. Adjustment to the team approach was difficult at first but was made satisfactorily.

Comment

This plan worked at this hospital but would, of course, have to be adjusted to meet the needs of each individual hospital. Several points appear now in the light of this experience to be most important in planning any kind of program for handling mass disaster victims:

First, the plan must be simple. Obviously, as the plan becomes more complicated the degree to which physicians, nurses, and nonprofessional personnel can be familiarized with its workings decreases proportionately.

Second, mass disaster situations must be postulated and the first 24 hours' treatment for the commonly expected problems, such as burns and fractures, must be outlined in detail. When the disaster occurs it is too late to plan for treatment.

Third, it is apparent that the team approach is the only logical one if chaos is to be prevented, and the team must be under the direction of one man, the disaster chief, who is thoroughly familiar with his job. Alternate chiefs should be trained in the event the disaster chief is not available.

Fourth, frequent practice sessions are necessary in order to familiarize all personnel with their part in the plan. These frequent trial runs are also important since, particularly these days, nonprofessional help varies from week to week.

Fifth, stockpiles, based on the outlined 24 hours' treatment, must be kept available. This applies not only to dressings and drugs but also to aged plasma and electrolytes. A readily available source of whole blood should be provided at all times.

Sixth, when the majority of the cases are burns, the exposure method of treatment appears to be the best and, in any sizable disaster, is the only way to handle burn cases. It requires much less stockpiling than the less-satisfactory, closed pressure method.

Seventh, the problems of identification among children, since they so infrequently carry wallets or other identification, make the idea of identification tags for school children a desirable thing.

Eighth, in planning for a disaster, it would be well if the personnel of each police district were familiar with the hospitals in their district and had on record an estimate of the number of casualties each could care for at one time.

The most significant conclusion to be drawn from this experience is that a small community hospital, properly prepared and aware of the problems involved, can handle a mass disaster.

4849 Fullerton Ave. (39).

TOWARD A SAFER HOLIDAY.—During the first 30 years of this century more people were killed and injured celebrating the nation's independence than in the War of Independence itself. Fireworks killed 4,290 persons and severely injured 120,000, as compared to the Revolutionary War of 4,044 dead and 6,600 wounded. . . . Right across the country there is a pattern of illegal sale of fireworks. . . .

The biggest operators, of course, are professional bootleggers. In 1956 the Bergen County, N. J. police were reported to have said that illicit trade in firecrackers, Roman candles, skyrockets, cherry bombs and other dangerous fireworks had reached the highest level since 1937, when the New Jersey control law went into effect. . . . Several states have no control laws, and bootlegging is still a serious problem. . . . When the laggard states join their sisters in passing the model control law, and when interested citizens in all states remain alert to the many dangers still inherent in our manner of celebrating our national birthday, it will deserve its rather premature title of "glorious."—Helen Augur, Gaps in Fireworks Control, *The Sight-Saving Review*, Spring, 1959.

MEDICAL RESPONSIBILITIES IN A CHANGING WORLD

Gunnar Gundersen, M.D., LaCrosse, Wis.

I do not have to prove to this group that this is a changing world. Nor do I have to demonstrate that medicine is also changing. Nevertheless, I want to outline briefly three important areas of change in America that are affecting, and will affect, medicine profoundly.

Population, Social, and Scientific Changes

At the 54th Annual Congress on Medical Education and Licensure last year, we learned from Dr. Dudley Kirk and the workshop session that the United States currently is undergoing the largest absolute increases in population in its entire history. Approximately 3 million persons are being added annually, and in 20 years we may expect to have a national population of 240 million.

In addition to pure numbers, our population also is being redistributed. The suburbs are continually outgrowing their boundaries, and now the flight is to exurbia, or to the more open spaces.

The age of our population is changing too. Today the nation grows younger and older at the same time. Present baby booms are keeping the population young, while the increasing numbers and proportions of older citizens advance the age of the population.

Within this growing population certain other social and economic changes are taking place. As Dr. Kirk pointed out, there is "a consistent trend toward upgrading the standard of living, the occupational class and the educational standards of our people."

Perhaps these three—income, occupation, and education—are in reverse order, for we know that, as education builds up the capacities through learning, the number of skilled and clerical workers and managerial and professional persons increases. These new positions then generally bring higher incomes.

One result of all this has been a raising of living standards. Important also is the fact that a person today is "what he can do," not "who he is" in terms of social class or ethnic, religious, or local background, as Dr. Talcott Parsons emphasized at last year's Congress.

Of course, there have been scores of other significant changes involving people: the public has become increasingly mobile, smaller families are in vogue, there is a trend toward early marriages, and there are new demands and needs for goods and services. Time does not permit me to dwell on these or any of the other meaningful social and economic changes. But I think we will agree that these changes are affecting, and will affect, medical practice.

On top of all this, the changes in medical science have been exceedingly dramatic. And the outlook is for even greater changes. As Dr. W. Barry Wood has said, today's medical scientist is probing "directly at the very secrets of life itself."

Equally as impressive as this depth of medical science is the growth in breadth. Modern medical science today encompasses all of the basic natural sciences. It involves the social sciences and the environmental factors of illness. It can truly be said that modern medicine is borrowing more each year from the sciences and humanities on all sides. Thus, we can expect that this depth and breadth in medical science will produce impressive aids for the control of disease in the decades ahead.

Having taken a quick glance at the wondrous changes in our population, social and economic matters, and medical science, how will, or should, all this affect the future of medicine and medical practice? How must we respond to these changes if we are to fulfill our obligation of providing the best possible health care to the public?

Medical Responses to Change

Here are a few effects and medical responses as I see them: First, more people, higher incomes, more health insurance, better standards of living, and higher education will increase the demand for medical service. To meet this demand we must insure the American people of an adequate supply of physicians not only in 1960 but also in 1970, 1980, and 2000.

For the past 25 years or more the output of our medical schools has kept pace with our population growth. Now, however, we cannot continue to be complacent over past or present accomplishments. We must look ahead, in the light of social, economic, and population changes, to any deficiencies, shortages, or new needs which can be anticipated in the future.

We accept the responsibilities for providing an adequate supply of physicians in the future, as we always have, and as a profession dedicated to public service we certainly have no intention of limiting the supply of physicians—even if we had such powers.

Second, the profession must insure the quality of physicians being produced. I believe that physicians should be liberally educated men and women, as well as being properly trained in medicine, so that they can fit their activities appropriately into the social and economic culture of their environment.

President, American Medical Association.

Read as the Walter Bierring Lecture before the Federation of State Medical Boards, Chicago, Feb. 9, 1959.

Certainly, graduates must be well trained in medicine. However, because of medicine's complexity, no physician can be an expert in all of medicine; his expertness will be limited to a fraction of the vast field. This does not mean the physician should have merely a superficial knowledge of medicine outside his chosen specialty—and I include general practice under that term "specialty." Quite the contrary, all physicians should have good training in all phases of medicine. Thus, they will be able to handle an array of problems and will know where and how to get answers when they are unable to solve certain medical problems.

I also think that quality in a new physician must include a good deal of the art as well as the science of medicine. Certainly, as we are confronted with a larger and more mobile population and an increasingly complex and frustrating world, new physicians must be ready, willing, and able to assume more responsibility for the well-being of their patients. Medical science has progressed to a great degree, but the need and the demand for physician responsibility and for the discharge of this responsibility with warmth and compassion has not been eliminated and never will be.

Third, the patterns of medical practice must be modified, as necessary, to make practitioners productive and effective in meeting the needs of today and tomorrow. I believe that we can make a big start in this area by giving more responsibility to other legitimate personnel in the health field, personnel now doing much that legally is deemed medical practice. Already we are depending more and more on the techniques and skills of paramedical professional persons; at the last count there were more than 62 such groups.

We need the ideas and the assistance of these persons if medicine is to provide the best possible health care for the public. Like us, they take pride in their work of service, and I believe that our profession must respect them and emphasize the dignity of their calling. By exerting cooperative leadership with, not dictating to, these professional persons, medical practice can gain new dimensions as we seek to prevent, diagnose, and treat disease together.

I also believe that a realistic approach to the economic aspects of medical practice must be taken, recognizing the change that has taken place and trying to work out adjustments to future change. Medical men must work cooperatively with others, I think, or have others superimpose a way of medical life that may give medicine little voice. Certainly it is unwise to expend our energies fighting battles already lost. Rather, we should always contend with present and future issues.

Currently, the American Medical Association is taking several positive steps involving the economic aspects of medical practice and medical care. Two months ago in Minneapolis the House of Delegates took a major stride in helping to solve medical and socioeconomic problems arising from a rapidly expanding aged population. By unanimous action the A. M. A. House of Delegates approved a proposal calling for physicians to provide medical services at adjusted rates to persons over 65 years of age with reduced incomes and modest resources.

The proposal asked insurance companies and organizations with prepayment plans to develop new policies at special low premium rates for those over 65 years of age who are in the low income brackets. The House of Delegates also urged that the A. M. A., the constituent and component medical societies, and physicians everywhere expedite the development of this plan. This is one example of concrete, positive action taken in behalf of providing the best possible health care for the aged at a cost that senior citizens can reasonably afford.

The medical profession and various medical societies also are experimenting with advisory fee lists to guide physicians as to the propriety of their charges. In addition, these lists are providing the insurer with essential data that are basic to the design and underwriting of adequate sound insurance.

Another example of medicine's concern in this area is the work done by the A. M. A.'s Commission on Medical Care Plans. One of the important recommendations by the Commission is that "the medical profession assume a judicious, tolerant, and progressive attitude toward developments in the medical care field. The need for continued experimentation is recognized, and the profession should undertake, and actively participate in, the study and development of various mechanisms for the provision of medical care of high quality." The Commission's report represents a sincere and intelligent approach to medicine's necessary adjustment to the changing world, and I have every trust that it will be approved by the House of Delegates in June.

These are just three of the realistic approaches being taken to the economic aspects of medical care and practice. They demonstrate that the pace of American medicine's response to new problems and new challenges in the dynamic world of medical care and medical practice is accelerating.

I also believe that the profession is alert to the continuing need for the family physician not only to render continuing medical care in a definitive sense but also to see that specialists' services are used wisely. Most physicians realize that a profession composed of only "true" specialists would be wasteful of time, money, and effort and would not result in uniformly good care.

We in the profession see an increasing need for the family physician who can assume comprehensive and continuing responsibility, commensurate with his professional competence, for the patient or his family. This physician must have a special concern for the problem of the "whole patient," particularly the different "lives" he lives such as at home and on the job. Moreover, he must coordinate specialty consultation and care according to the requirements of the particular patient.

It is medicine's responsibility to insist that all physicians are competent for the medical service they undertake. Likewise, the profession must be willing and ready to discipline its members when and where there are instances of professional incompetence, no matter whether these involve family physicians or specialists. These, then, are some of the responses that the medical profession as a whole must make in fulfilling its responsibilities in this changing world.

Specific Responsibilities

As a federation, I believe that you have certain specific responsibilities in helping the profession provide the best possible health care for the American people. Let me enumerate a few of these. Because one of the major characteristcs of population change is real and increasing mobility, physician movement must be encouraged if the needs of a shifting populace are to be served. Therefore, there is a need for the extension of a uniform policy of endorsement or reciprocity of medical licenses. Also, with high standards of clinical clerkships being attained by most medical schools, it seems inevitable that the future of the internship—as now known—is questionable. However, there also is general agreement that one year of hospital experience beyond medical school is not adequate preparation for medical practice of either a general or a specialty nature.

Therefore, I believe that state boards should begin to consider modifying their requirements. Laws, rules, and regulations should allow freedom for sound experimentation in the medical school curriculum. I believe that the natural result would be an expression of confidence in our medical school faculties, and this could best be reflected by requiring only that students be graduates of approved medical schools in the United States or Canada. (The program of the Education Council for Foreign Medical Graduates promises an equitable approach to graduates of other countries coming to the United States.)

The boards should also explore with medical educators and others the feasibility and desirability of requiring a minimum of two years of approved hospital training after medical school before the physician is eligible for full licensure. Frankly, I am not certain whether this should be a legal requirement or a voluntary matter, as is internship in many states at the moment. In any case, there no longer exists good reason for spelling out the detailed nature of hospital training, for, it seems to me, it would be more realistic and effective to leave this to those institutions and agencies most directly concerned with educational methods and standards.

Moreover, years of experience have indicated that the quality of medical care rendered will not be uniformly of the high standard that the public has every right to expect without some definite stimulus to insure that all practicing physicians regularly keep abreast of important developments in medicine. Here are some of the many possible forms that this stimulus could take: 1. It could be a requirement of licensing that holders of licenses must at intervals demonstrate (through reexamination) that they have retained important basic knowledge and competencies and have kept up to significant advances. 2. It could be a requirement of licensing boards that holders of their licenses regularly participate in acceptable programs of continuing medical education. The developing activities of the Council on Medical Education and Hospitals in the postgraduate field should make this approach feasible in the near future. 3. This stimulus could be made a nongovernmental function by making reexamination, postgraduate education, or both requirements for continuing membership in organized medicine and specialty and other medical associations. This idea would broaden the kind of function now performed by the American Academy of General Practice.

I am not at all certain which of these methods is best. The first (reexamination) would produce the quickest result, but there is no assurance that it is best. This is a matter for careful study by all concerned, and it seems a logical function of the federation to pursue actively this study in cooperation with other medical groups that are interested and share this concern.

I do not offer this latter suggestion as something to consider, say, in 1965, 1975, or some later date. I strongly believe that the public and the profession must be assured now of the high standards and qualifications of physicians. Somehow this must be accomplished if medicine is to live up to its full responsibilities in this changing world.

Let me assure this federation that the A. M. A.'s Council on Medical Education and Hospitals is and will be interested in pursuing with you jointly all these matters concerning continuing education, reexamination, a minimum of two years of approved hospital training, curriculum experimentation, and requirements for medical school graduates.

To me the title of doctor of medicine has always meant obligation and responsibility. In this present era of rapid change and development, men of medicine must look at themselves and their profession with searching eyes and a critical mind. If we are willing to do this and are ready to take all positive steps that are necessary, we will fulfill the pledge of our profession to the public to attain the best possible medical care for the American people.

1836 South Ave.

WHY THIS CONFERENCE?

Leland S. McKittrick, M.D., Brookline, Mass.

The breadth and increasing complexity of medicine have made it necessary for the physician to concentrate his efforts in certain limited areas for purposes of study and teaching and for the clinical application of what we already know and are now learning. It is through the intensive efforts of various groups working in special fields at the research and clinical levels that the amazing developments of the past two decades have been possible—developments the magnitude of which no one could possibly have foreseen when the first specialty board (ophthalmology) was organized in 1917 to (1) elevate the standards of ophthalmology, (2) determine the competence of ophthalmologists who desire certification, (3) conduct examinations for candidates who appear before the board and issue certificates to those who pass, and (4) act as advisors to prospective students in ophthalmology.

From the expressed purposes of those who founded the board it would seem almost certain that they expected to establish ophthalmology more firmly as a special field of endeavor, to establish minimum standards, and to place an official stamp of approval on those who were able, by examination, to show evidence that they had acquired the necessary educational and practical experience.

Although this small group recognized the importance of establishing definite educational standards for the practice of a specialty, no one of them could possibly have foreseen the importance of this step in the preparation for, as well as the practice of, the specialty. Nor was this recognized in other areas until the 1930's. During this decade widening interest resulted in the rapid development of 13 new specialty boards. In 1933 the Council on Medical Education and Hospitals was authorized by the House of Delegates of the American Medical Association to "express its approval of such special examining boards as conform to the standards of administration formulated by the Council." Within a year the Advisory Board for Medical Specialties was organized. There are now 18 recognized specialty boards and, in addition, the American Board of Thoracic Surgery, which is organized within the framework of the American Board of Surgery. Since the several areas of clinical specialization are still without board status, the end may not yet be in sight.

These boards have not developed according to any preconceived plan or pattern. Specialty boards are approved by the Council on Medical Education and Hospitals after study and recommendation by the Advisory Board for Medical Specialties. Each board, for practical purposes, then becomes autonomous. Each may conduct its own affairs with little regard to the over-all developments in medical education and medical practice. Nevertheless, because of them our research has been more rewarding, our teaching at the graduate and undergraduate levels has improved, and those patients for whom specialty care has been available have benefited greatly. Board certification has assumed a position of importance—in government, hospitals, and educational circles—neither foreseen nor desired by the most ardent supporters of the boards. Even the evil heads of medical economics and philosophies of medical practice have been raised.

Our own interest is primarily in the broader aspect of education. Will the best interests of education continue to be served by further fragmentation of study of the human body and its ailments with the resulting rigid and, at times, uncorrelated departmentalization within our larger areas of medicine and surgery? I doubt that anyone would suggest that we discontinue our training programs aiming toward certification in general surgery and, instead, develop one surgeon to do hysterectomies, another to do supradiaphragmatic repair of the hiatal hernia, another to remove carcinoma of the intestine, and still another to resect the aortic aneurysm. Yet the development of specialty training programs, each with its own resident staff, is making it increasingly difficult to maintain good training programs in general surgery in many of our best hospitals.

In recent years I, as a surgeon, have tried, without success, to reorient in my own mind the relationship between the surgical specialties and general surgery. Is a surgical specialty an area within the broad base of surgery in which special knowledge is acquired and training in the special techniques obtained in lieu of a better understanding of the broader physiological, pathological, and technical aspects of general surgery; or should certification by a surgical specialty board designate the acquisition of special knowledge and special techniques over and above those of the general surgeon? Is it this latter concept of a surgical specialty that prompted the founders of the Board of Thoracic Surgery to require certification by the Board of Surgery before becoming eligible for examination by their own board? Thinking again in relation to my own specialty, I have asked myself if the rebirth of Wertheim's operation for cancer of the cervix and the development of pelvic exenteration for late can-

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Chairman, Council on Medical Education and Hospitals, American Medical Association.

Read before the 55th Annual Congress on Medical Education and Licensure, Chicago, Feb. 8, 1959.

cer of the female genital organs represent advances within the special techniques of obstetrics and gynecology or if they are only examples of the extraordinary developments in the broader field of general surgery. Is knowledge of the technique of total cystectomy with internal kidney drainage and an understanding of the early postoperative complications which may follow more closely allied to the problems of abdominal surgery or to those of the genitourinary tract? To put it concisely, considering the developments of the past decade, both in special fields and in surgery in its broader sense, is it easier to make a good specialist out of a well-trained surgeon or a good surgeon out of a well-trained specialist? I raise these questions in a spirit of complete understanding of our debt to the specialty boards for their invaluable contributions to medical research, teaching, and patient care—not in a spirit of criticism. I do suggest, however, that the developments in all fields of medicine since the organization of the boards have been so rapid and of such magnitude that the time has come when medicine as a whole and its specialty groups should carefully reevaluate the effects of our newly acquired knowledge on specialization and its relation to the parent disciplines and to our future educational programs.

1180 Beacon St. (46).

WHY THIS CONFERENCE?

Ernest L. Stebbins, M.D., Baltimore

The Advisory Board for Medical Specialties was established 25 years ago. There was, at that time, a growing concern because of the degree of specialization in medicine resulting from rapid advances in medical science and technology. The purpose of the board was to provide a mechanism for continuing study of some of the problems of specialism and to encourage and maintain standards of graduate education and training in those fields of medical practice in which highly specialized knowledge and skills are required. At the time the board was established, there were four organized specialty boards concerned with educational standards which offered examinations to test competency of specialists in these four medical specialties.

In 1958 there were 18 specialty boards represented on the Advisory Board for Medical Specialties, and these boards examined candidates and issued certificates in 51 different specialties or subspecialties of medicine. The proportion of licensed physicians certified by the American boards has more than doubled in the past 10 years. This increase in specialism is perhaps most obvious in medicine, but it is not peculiar to medicine. There has been a similar trend toward specialism in almost every phase of professional, scientific, and technological activity.

Reason for Trend Toward Specialism

The reasons for this trend toward specialism are many. The most obvious is what has been called the "explosive" rate of technological change and the increasing complexity of the whole range of scientific endeavor. This explosive increase in knowledge is directly related to an increased recognition of the value of research and discovery. The wartime development of research in nuclear physics served as a demonstration of the tremendous potential of organized and systematic study of unsolved problems. The impact of this demonstration is seen in the striking increase in support for medical research in the postwar period. The results of this acceleration in an already rapidly developing scientific field have been greater demands for education and training and inevitably greater specialization.

A less obvious, perhaps, but none the less important factor in the increase in specialism is the natural human drive toward excellence. The satisfactions derived from superior accomplishment are a powerful incentive, even though this may mean a restriction of the field of activity. The extent to which this restriction of the field may be necessary is related to the length of time necessary to acquire the special knowledge and skills. It has been estimated that a lifetime would not be long enough to acquire a high degree of competence in even a fraction of existing medical specialties. Consequently, specialism has tended to concentrate on

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President, Advisory Board for Medical Specialties.

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highly technical skills, organ systems, groups of diseases, parts of the human body, or segments of the population. Other less admirable reasons for specialism include the greater material rewards frequently offered and the social prestige associated with at least some of the medical specialties.

Impact of Specialism on Medical Education

The impact of the trend toward specialism on medical education has been profound. There is some evidence of the influence of this trend to specialism on undergraduate medical education, but it is particularly felt in graduate education and training. The specialty boards, with few exceptions, require that every applicant for certification shall have completed from two to five years of formal and approved graduate education and training in the field in which they wish to be certified.

The Council on Medical Education and Hospitals of the American Medical Association, working closely with the specialty boards, reviews the quality of the educational programs in hospitals or other institutions providing specialty training. In 1934, when the Advisory Board for the Medical Specialties was established, the Council listed 377 approved hospitals offering 2,373 approveesidencies. In 1958, 1,248 approved hospitals red 5,300 approved residency programs providi opportunities for specialty training for approxitely 31,000 physicians preparing for examinati and certification in one or another of the recaized specialties of medicine. Residency trainig has become a rapidly increasing and more an more important component of the total program o medical education in the United States.

This tremendous increase in specialism in medcine has raised many questions. Is the trend towd more and greater specialization in the best intes. of the patient and of the physician? Does it pr vent or interfere with the necessary continuity an personalization of the care of the patient? A there serious economic consequences to both th patient and the physician? Has specialism, or mo specifically the specialty boards, had an undue i fluence on graduate medical education throug rigid requirements which must be followed in or to achieve the coveted certification? These a questions which seem to deserve the se thoughtful consideration of the medical p and those interested in the improvement o care in the United States.

THE RISE OF SPECIALISM IN MODERN SOCIETY

Paul M. Gross, Ph.D., Durham, N. C.

I am honored to be asked to present the initial background paper at this 55th Congress on Medical Education and Licensure, the broad subject for discussion of which is "specialism in medicine." Nevertheless, I must begin by warning that I am somewhat at odds in my thinking with some of the implications of the title which has been assigned to me, that of "the rise of specialism in modern society."

History of Specialism

If the methods of modern quantitative sociology were applicable and if the historic source materials were available, I strongly suspect that it could be demonstrated that "specialism" has always been an accompaniment and even an essential element of organized societies, especially those which were as highly urbanized as our own. Indeed, this has been done, in some measure, by such archeologists as V. Gordon Childe and others, who place the beg nings of specialization as far back as Neolithic ti in the early history of man's development.

Faced with the bewildering complexity of o own social structure, its profusion of impleme machines, instruments, devices, gadgets, and pecialisms, we are prone to think the latter are har acteristic of our time. Anyone who has visite Museum of Egyptian Antiquities in Cairo anc the high state of development of household an fine arts in such exhibits as those of the Tutankl amen tomb (1350 B. C.) must realize this civil zation had its full quota of specialists of all kind These must have included not only highly deve oped specialties among artisans and craftsmen bu a professional type of specialization in architectu and engineering. All evidence points to a simil high degree of development of specialism in household arts, agriculture, and the fine arts. one must speak with caution of the "rise" o cialism in our times. It has been a continuing le ponent of civilization, at least in historic times.

Vice-president, Duke University.

Read before the 55th Annual Congress on Medical Education and Licensure, Chicago, Feb. 8, 1959.

Wh other aspects of specialism in our society
we w it today? How many specialisms are
ere ir social structure? It is easy to find listed
ne to five hundred of these if one looks in
h ace as a guide to allowable income tax
ucts related to one's job. Actually, there prob-
s many more again if we include the more
ecialties, such as those of abbot, through
ur and dowser, to zitherist. Are we all
, and what do we think of specialization
our own? Do we not all in some measure
ith Shaw's statement in the "Doctors Di-
that "All professions are conspiracies against
ity"? Indeed, we may ask whether there is any
n denominator or "common man" of the
" brand. Are we not in reality confronted
plex social structure with a "lack of
is is at least in some measure the case,
be one of our grounds for suspicion and
bout the growth of specialism in all lines
avor. We may ask if this is a characteristic
r modern society and in a measure unique to it
o our times. Again the answer appears to be
ive. The thoughtful citizen of the great ancient
polis of Rome with a population of about
,000 persons in the second century A. D. must
been confronted with some of the same ques-
we are discussing today. The highly organized
ation of the Roman Empire must have re-
d a great degree of specialism among its
nry to sustain its roads, aqueducts, commerce
food supply, logistics of the support of its
s, and the government of its far-flung colonies
provinces—not to speak of the high state of
opment of the fine arts and literature of its age.
us it appears clear that elaborate specialism, at
somewhat comparable in scope to ours, has
a constant and prominent ingredient of all
civilizations and especially of those which
highly urbanized. If this gives us a correct
ical perspective on specialism in modern so-
we must look elsewhere for the concern about
aspect of our society's organization which
to conferences of the type of this one. It
rs that our search for an understanding of this
rn must take at least two directions.

The Nature of Specialism

e first of these relates to the very nature of
alization itself. Particularly in the realm of
ectual endeavor the intense concentration of
son on a limited special area of knowledge and
tainment of expertness and competence in this
tends to break the broad pattern of uniformity
over-all social structure, especially in a demo-
system such as ours. This degree of separation
ven isolation of the person from the broad
m of the common affairs of man may lead to
iness in the mind of the average citizen. I am
ll of us share this feeling in some measure when we consider the specialisms followed by others, though of course we always except those in which we are, ourselves, engaged.

Numerous examples of this situation could be cited. One of the most obvious is the broad reaction in the body politic to the economic ideas and influence of the economic advisors to the "new deal" school of thought under Roosevelt. The uneasiness is often greatly aggravated by the habit of specialists to develop and use an entirely new nomenclature and terminology in describing and discussing their specialty. The one-time vogue of the word technocracy well illustrates the point at hand. These comments would appear to be valid in relation to specialization in any area of human endeavor, whether in science and technology, in the labor structure, or in the arts. The existence of highly differentiated specialisms is bound to present a certain divisive element, which, at times, may be characterized as subversive, in the broad fabric of the social structure. Thus, in public opinion, the discoveries of the nuclear physicists and chemists leading to the release of nuclear energy were, and still are to some degree, thought to be an area in the search for new knowledge better left unexplored. Such thinking was obviously not confined to the common man and the general public, if we recall the controversy among scientists, themselves, as to whether investigations leading to the development of the hydrogen thermonuclear reaction and the hydrogen bomb should be undertaken at all. This reached high places in the scientific hierarchy and was one of the crucial elements involved in the Oppenheimer loyalty investigation. This particular situation pointedly brings out one of the difficulties of specialism, namely, that the eminent specialist highly qualified in his own field is often regarded as competent and expert in the broader problems of human endeavor. All too often this is not the case. As Sir Arthur Conan Doyle, in "His Last Bow," described one of his super sleuths, "All other men are specialists but his specialism is omniscience." Here, then, is one of the dangers and one of the reasons for concern about specialism—not specialization per se or the attainment of great competence by the specialist in his field but the public's tendency to assume that such expertness provides sound ground, and even a type of omniscience, in dealing with the broader problems of human affairs.

Specialism in Science

The second direction in the search for the origin of our concern with specialism in modern society relates to the emerging scientific specialism. I have no competence to judge whether this applies to other areas than the sciences, so my discussion will be confined to the changing nature of scientific and technical specialization as we see it today.

ckground, we need to consider the modern opments in science, itself, to show their signifi-ce for specialism in our society. To understand he picture clearly we must differentiate between two broad kinds of specialization. The first of these, while it exists in large measure in our present society is not new but has had the same components throughout history. This can best be described in terms of the high degree of skill and intimate knowledge that the artisan, craftsman, artist, or workman in a special area can and does attain through long practice, deliberate development of skill, and wide and increasing acquaintance with the material and function of his specialization. It is best characterized by speaking of the art involved in his specialism. The competence of specialists of this type has constituted, and still does, the backbone of much of our working civilization and of its basic needs, as well as luxuries and enjoyment. In other words, high competence in the development of arts and crafts of our time has brought us to the rich level of civilization which we enjoy, whether or not we endow the experts in these fields and the fields, themselves, with the dignity of professionalism. Such growth will continue to be effective in the further development of the arts and crafts and even in much of our technology.

To this continuing and ever-growing stream of specialization, a new and important element was added beginning about the middle of the last century. This was the methodology of research and development as we use it today. From its limited effect in the last century, this broad technique has, by the middle of this century, become the most important single influence in scientific, technical, and industrial areas that affects our rapidly changing civilization. To understand this and its significance for the concept of specialism, particularly in tech-ical areas, requires a review of the changes in science during the past century.

This is not the place to develop these in detail, nor is there need to do so for this audience. Suffice it to say that from the early days of the alchemist to the opening of this century, scientific activity grew at an increasing rate and its importance and relation to economic development was greater with each passing decade. Nevertheless, the scientist, and especially the so-called pure scientist, continued to be a little-known member of society who worked in relative isolation in his "ivory tower" laboratory—commonly on some university campus. During, between, and after the two wars, a new scale of scientific and technological activity emerged. One of the first and most striking points of impact of this new activity was in the area of military affairs. The war gases of World War I, the development of air transportation and the great air forces, rockets, and the proximity fuse of World War II, were part of a trend to the highly scientific warfare techniques of today. The capstone to this trend was the development of the nuclear bombs, of nuclear propulsion in the Nautilus, and of missiles and the orbiting satellites.

Of equal and even of greater significance was the impact of this new technique of research and development on industry, commerce, and the entire economic structure. Old industries were revitalized or fell by the wayside; entire new and often giant corporate enterprises based on new products emerged, as in the electronics industry. Old ones, such as the food industry, were completely changed through new packaging and marketing techniques. The basic know-how for these changes came rapidly in a span of some quarter of a century through the widespread establishment and application of industrial research and development laboratories and their techniques throughout much of industry. What was literally a new type of industrial revolution was an accomplished fact by the middle of this century.

This is an old story to most of us here. What is not so well realized or so often understood is the enormous effect of these changes and of these new developments on the broad discipline of science itself. The rapid growth of the ranks of the scientific population and their spread and diversification, the new facilities, instruments, and techniques available, and the realization of the power and importance of well-organized collaborative effort have had the significance of a fourth dimension in scientific thinking and activity. As a consequence, there is new imagination, boldness, and scope in scientific planning and execution. This is well exemplified by the world-wide scientific enterprise we know as the International Geophysical Year. Here for the first time is a full-scale concerted effort in both time and space to understand the nature of the earth's environments—weather, climate, atmosphere, land, and oceans—and to analyze the hail of outer space radiation, luminous, thermal, ionic, and nuclear, to which this planet and its life are constantly subjected. Further, it is important to understand that this new effort is multidirectional. Global studies and the reach to outer space are spectacular but no more bold or imaginative and probably less significant for human affairs than the probing in depth of the chemist and physicist within the atom and the nucleus or of the biologist and biochemist within the cell and the genes.

So much for the renaissance in science, but what of its implications for this discussion of specialism? One thing seems clear and can be pointed up by an old saying which many of you must have heard. This is the description of the attributes of a specialist (usually a scientist) in comparison with those of a salesman:

"A salesman is one who begins by knowing a little about everything and who goes on learning less and less about more and more until he ends up knowing practically nothing about everything." On the other hand, "A specialist is one who starts off knowing a great deal about very little and goes on learning more and more about less and less until he ends up knowing practically everything about nothing."

The first description we can ignore for our present purposes. The second, in spite of its nonsense-lyric flavor, will bear more scrutiny in terms of this discussion. The trouble here is the lay conception that what is restricted or limited is simple and in its limits amounts to "nothing." Here is one cue to the problem of specialism, particularly in science, and to the lay public's understanding of it. As scientists we should not lose our perspective but recall the history of our discipline and remember that it has survived through pestilence, wars, and disasters and surmounted the barriers of race, language, and religion. It is indeed well to recall in this gray period of cold war with its iron curtains that the human race throughout its long history and evolution has had one common opponent: inscrutable nature, nature with her seemingly inexorable laws, her hosts of organisms and parasites, hurricanes, and catastrophic events of flood, earthquake, and epidemic. For our human race the central problem still remains to understand nature and control it. Scientists are privileged, as the lay public is not, to appreciate the great accomplishment of the truly great specialist with his fascinating glimpses of things to come, as the ramparts of our incomprehension of nature are breached from time to time by a "break-through." These ramparts are formidable in their complexity, and it is rare that they succumb to an attack along a broad front and then only in the hands of a genius—and geniuses are rare in the human race.

Justification for Specialism

Here then is the basic justification for specialism in science. The fundamental, over-all problem confronting us, that of a better understanding of nature, is immensely complex and involved. Only by concentrated, competent, and enlightened attack at numerous limited areas as they open up to us through investigation can we ever hope to begin to understand the whole. By this token one can confidently predict that true specialism in science will continue to survive and multiply.

This confidence is further strengthened as we look ahead in the light of the past. In science, much of our concern and achievement of a successful understanding has been in relation to inanimate things or parts of things or with relatively simpler organisms or functions within organisms. We must not forget that we, ourselves, are part of the great fabric of "nature." As our investigations and growing knowledge permit us to move more surely to such studies as some branches of human behavior and its physiological, genetic, and other bases, we can envisage new coalitions between neuroanatomists, neurophysiologists, and psychologists. T will, in turn, develop as specialties and may ev be dignified with the designation of professions or even disciplines, as in the case of present-day biochemistry and biophysics.

Facing this prospect, alarming to many of us, let us look at the negative aspects of such a further development of specialization and post some warnings. Specialization in the historic and classic context is here to stay; we can do nothing about it. The type of specialization arising from the renaissance in scientific thinking and operation will have a profound impact on the growth and character of science. Here the danger is that the form will be mistaken for the substance. To illustrate and at the same time not to draw invidious comparisons, let us imagine some future specialism, which, for want of better term, we will call neurobehaviorism. On what will its worth and validity as a contributor to our knowledge and as a field of endeavor depend? In the first instance, it depends on how well the workers in its field are based in the fundamentals of the derivative sciences of neuroanatomy, neurophysiology, and neurobiochemistry. Of as much or even greater importance would be how well they understood, or could acquire understanding of, those relevant and applicable principles from the basic, underlying sciences of mathematics, physics, chemistry, biology, and psychology.

In other words, the criterion of the worth and validity of an area of specialism in the sense outlined here is how solid and clear the pathways are from the outer branch to the deep and firm roots of available knowledge. An episode which Prof. Perry Miller relates about Ralph Waldo Emerson in the late 1830's at Harvard is to the point here. At that time, the then-young naturalist philosopher Henry Thoreau was an intimate of the Emerson household. One day he sat quietly in a corner while Emerson expounded to English visitors, "At Harvard college they teach all branches of learning." Thoreau then embarrassed his patron by blurting out, "Yes, but none of the roots." Unless there is vital and continuing sustenance from strong roots the branches of specialism will bear meager fruit.

Since this conference includes, as it should, discussions of medical education and research, it is appropriate to allude at least briefly to some of the implications that may be seen for scientific training in general and medical training in particular. Here one consideration seems paramount, and Thoreau's comment carries deep wisdom. Our effort in all scientific education should be to lay soundly the important fundamentals and to inculcate the knowledge of how to reason and make application to the particulars. As scientific knowledge becomes more and more complex there is no hope for sound training, within the limitations of the human mind and capacity, but to follow this route. The experience of the great and small industrial research organizations in the past 25 years provides clear evidence to support this point of view. In the early days of their inception in the 1920's, the total number of engineers and scientists employed was well below 100,000. At that stage of their growth they talked often of trained dye chemists, textile chemists, refrigeration engineers, and others in recruiting new employees from educational institutions. Today, after this experience and with a scientist and engineer roster of some 750,000, they ask that the scientific educational institutions train such students in the fundamentals of mathematics, physics, chemistry, biology, and similar disciplines and that they try to teach the technique of application to a particular problem. While the problem of sound medical education is admittedly more complex, there is at least food for real thought in this experience.

In retrospect, it appears that this presentation, contrary to its own theme, has been an attempt to select what appear to be the few essentials of the situation with respect to specialism in modern society. Such generalization has its obvious pitfalls. Perhaps it can be best characterized in the phraseology of Dean Wilburt C. Davison of Duke University Medical School. In the preface to his book "The Compleat Pediatrician," which copies the format of Izaak Walton's "The Compleat Angler," he says: "In contrast to many pediatric books which too often resemble the old-fashioned hoop-skirt in covering the subject without touching it, this book is like a G-string in touching the subject without any pretense of covering it, or even more aptly, like a brassiere in only touching the high spots. In other words, this book attempts to present the bare facts."

It is hoped that this discussion has pointed up some of the "bare facts" and high spots of specialism in our society and of their origins and that it will serve as a useful backdrop for the further detailed sessions of this congress.

SPECIALIZATION AND THE PURSUIT OF EXCELLENCE

Moody E. Prior, Ph.D., Evanston, Ill.

To what extent is specialization compatible with the pursuit of excellence? This is the question implicit in the association of these two ideas in our title. And since we are living in a civilization which requires and cultivates a higher degree of specialization than any in the past, we are also asking by implication whether our civilization is compatible with the pursuit and attainment of excellence.

Problems of Excellence

It is safe to assume general agreement on the proposition that the attainment of excellence is the proper end in the cultivation and use of our faculties, just as health is the proper condition of our bodies. Among normal people a serious disregard of health is felt to be irresponsible and the deliberate committing of acts which must destroy health is regarded as abnormal. We have somewhat the same feelings about people who misuse their faculties, fail to cultivate their talents, and are slovenly about their human powers and special abilities. We normally respect the person who attempts to maximize his powers and to realize fully his special talents and even to cultivate style and elegance in his use of them. "If our virtues did not go forth of us," says the Duke in "Measure for Measure," " 'twere all alike as if we had them not."

The comparison with health is suggestive not only where the analogy applies but also where it does not. In its ideal condition, health requires neither awareness nor deliberate effort. The healthiest object in nature is an active child who is unaware that he is healthy. It is only during illness or when the optimum state is past that we become aware of health and cultivate an interest in improving or maintaining it. With our faculties and powers the case is different. Even in skills, such as walking, which seem instinctively prompted, their mastery requires conscious effort, imitation, and improvement. The use of our faculties has to be learned. Moreover, we must practice and cultivate habits for their correct use, and, even after we have learned some skill, we must occasionally review its status and correct our lapses or try to conform to better models. This applies not only to manual skills but to such skills as speech and the proper use of our intellectual faculties. We usually take it for granted that we can speak and reason, but to refine these abilities we study the principles of

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Dean, Northwestern University Graduate School.

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grammar, rhetoric, and logic and we acquire such sophisticated tools as scientific method. Excellence has to be acquired.

There is another difference. Health is indivisible; it is total. The satirist Swift pointed out that the reason we talk so much about illness is that it has many fascinating variant forms, whereas health, like goodness, is a single state and does not therefore provide so many interesting topics to talk about. Excellence is unlike health in that it is of particulars. It is concerned with particular skills associated with particular human powers and faculties. Since these have to be trained and their appropriate skills learned and mastered, there can be no total excellence. We admire the command of language of a writer, the fine physical coordination of the athlete, the virtuosity of the musician, the experimental brilliance of the scientist. But we find that these various forms of excellence do not exist simultaneously in all people. Versatile people are rare, and their versatility is, in any case, limited to a few things. Even within a particular area, the range of excellence is circumscribed. We do not normally find combined in one person the original composer and the fine tenor, the outstanding tennis player and the outstanding football linesman, the great writer and the great actor, the astronomer and the biologist. The conclusion is, I think, inescapable: excellence demands specialization.

It would appear that we have resolved the question with which we started. Not completely, however. Although our conclusions so far are not likely to be challenged, there exists at the same time a universal suspicion that the excessive development of any single facet can have a deforming effect on the person. The ideals and models of human development which have been admired and recommended by great civilizations in the past have invariably emphasized the harmonious development of the whole man, and this prototype still appeals to us today. We share the universal awareness that, like many good things, specialization has its abnormal and perverse manifestations, but in our time this realization is rendered urgent and acute because the technological standard of our civilization and the learning on which it depends require an unprecedented degree of specialization and it appears that we are compelled to risk its worst evils and abnormalities in order to secure the advantages of specialization—the existence and well-being of our society. The normal word of caution about the dangers of undue concentration on a limited area of skill and expertness has accordingly assumed the proportions of an elaborate critical apparatus. Our graduate and professional schools are criticized for turning out narrowly trained men, and specialism is attacked with seriousness and asperity and, sometimes, with a note of impatience similar to that which colors writing on the subject of teen-age mores and juvenile delinquency.

Problems of Specialization

In order to preserve a sense of proportion it is important to bear in mind that there are inherent defects which can appear even when specialization is pursued with the best of motives, the desire to excel and to become proficient in some useful art or science. Any such effort requires a degree of technical mastery and expertness. This skill is not the end but the means. But as long as one is clumsy or uncertain about the means he cannot make the best use of his talents and direct them to their proper ends. As long, for instance, as a musician is not master of his technique, he cannot put his mind to the meaning he is trying to get out of the score. Only when technique is largely a matter of habit and can be disregarded is one in the best position to exploit his art or profession or trust himself to attempt innovations. For the beginner, however, the mastery of the means is a difficult and absorbing matter and virtuosity becomes the immediate goal and sometimes the end itself. Often he is encouraged in his confusion. Virtuosity and extensive knowledge are widely admired, and they have a legitimate appeal of their own. We learned from the quiz shows that large numbers of persons stand in awe of anyone who has accurate answers to tough questions over a wide range of topics. And most of us experience exhilaration at witnessing a hard technical feat performed with apparent ease—the sense of difficulty overcome, as Wordsworth put it. I have noticed in dance performances that the applause often comes not when a beautiful effect is realized but when something difficult is done repeatedly, even though at times the stunt looks painful or ludicrous.

The striving for technical perfection or for total knowledge within a particular field of learning is admirable, but it is also the beginning of pedantry when these become ends in themselves and are divorced from their true purpose and the proper consequences of their use. Pedantry in learning has always been an easy and favorite mark for the satirist. Swift, writing in solemn irony, remarks that, as distinguished from superficial learning, true wisdom is like a hen "whose cackling we must value, because it is attended with an egg," and like a cheese "whereof to a judicious palate, the maggots are best," and, lastly, like a nut "which unless you choose with judgment, may cost you a tooth, and pay you nothing but a worm." But there is a pedantry in things other than learning; there is also a pedantry in skills, virtuosity, and expertness.

In an indulgent mood, we can regard the display of expertness and learning for their own sake as harmless. It elicits applause, and it might prove useful sometimes. But we should temper our indulgence when we reflect that it is always a human error when the means and ends are confused, and sometimes it is not harmless. The expert is not happy unless he uses his expertness, especially when his skill wins him applause, and the narrower the skill the more compulsive is the need to use it. If there are no occasions, he makes them. This accounts for our nervousness when the military gets hold of a fine new weapon. Often the exercise of a skill becomes a ritual act. We are familiar with the phenomenon of fashions in medicine. I suspect that they are often the compulsive and ritual manifestations of a useful knowledge or skill. Not too many years ago it was regarded bad practice not to extract any tooth that was devitalized or even suspect. During the same era the slop pail became the destiny of many a tonsil which today would be treated with more respect. Fortunately, the compulsive and ritual exercise of expertness is often self-correcting, since it tends to go too far for its own good. And there are always the maverick, the genius, and the skeptic in the new generation to set things straight again. In the meantime, however, the quest for excellence is perverted. Finally, the repetitive exercise of skill and the routine application of even an impressive body of knowledge tend to block originality. Hence the paradox that, although the full concentration of our powers on a proper end is difficult until the mastery of the means becomes almost a matter of habit, the expert who has come to depend on the habitual exercise of his specialty is unlikely to innovate—except by accident, when he needs to have all the luck on his side.

These various deformities of the quest for excellence are inherent in the nature of specialization in the same way that each possible form of government has its obverse side, so that, as Aristotle pointed out, monarchy can become tyranny, oligarchy bureaucracy, and democracy rule by demagogue and mob. Every civilization has therefore had to recognize the detrimental side-effects of specialization, since specialization is a necessity of civilization. Primitive man does everything for himself. It is only when functions become differentiated that arts develop, mastery over environment increases, and thought and leisure are possible. From this point of view no civilization can be compared with our own. In consequence, the accompanying vices of specialization are potentially increased, for as knowledge becomes more exact and practice becomes more effective the number of specialists increases. This subdividing has affected even apparently simple crafts (I have been informed that among expert tailors a coatmaker would not undertake to make a pair of pants), but when we come to the various advanced sciences and technologies the subdividing becomes formidable. It was once possible to speak simply of physicists, biologists, and physicians. I recall the lettering on windows of comfortable-looking houses and small office buildings: Dr. Blank, Physician and Surgeon. Within a few decades all this has been changed. At the dedication of the Midwest Library Center a few years ago, one of the visiting librarians was introduced to a distinguished scientist who was described as a mathematical biophysicist. The librarian was annoyed. "Why," he said, "can't you fellows stay within the system of classification established by the Library of Congress?"

This librarian, however, is in a dwindling minority. The public admires specialists. The professions admire them. The so-called generalists are out of fashion if not out of date. Occasionally we do them homage, as though recognizing an impossible ideal for old time's sake. Now and again the medical profession will single out a general practitioner toward the close of an honorable career and give him public honors, but there is something sentimental and nostalgic about this gesture. It is as though there had been introduced the practice of honoring the knight of the year during the late Middle Ages after the invention of gunpowder and firearms. Fundamentally, our instincts are right. We respect the man who tries within the short limits of a lifetime and the demands of an important field of activity to take all knowledge to be his province, but we are at the same time aware that, the more knowledgeable and effective a profession becomes, the more refined are its means, the more exacting its demands, and the more likely its drift toward increasing specialization. As primitive man is a generalist and takes care of all his own needs, the practitioner in the primitive stages of a science or profession encompasses all the parts and skills of his chosen field. As the profession advances, its parts are differentiated.

This process of differentiation in all branches of learning and in all professions has proceeded at an incredible rate during the last few decades. If we have come to pay tribute and do homage to the specialist it is because we recognize him as an absolute necessity in the advanced state of our technological success and the magnificent complexity of our civilization. He is our high priest. But we have not, at the same time, neutralized any of the endemic diseases of specialization; we have only multiplied the chances that they will occur and increased the possibility that when they do occur they may be harmful. Moreover, because the power and prestige of specialization have been widely acknowledged, specialists become increasingly concerned about status. They are jealous not only of the position of their profession in society but of their position and their rights and privileges in their own profession. (There has never been a jurisdictional strike in medicine, but there is no theoretical reason why there should not be.) And as specialties multiply and narrow in range, while simultaneously their prestige increases, it becomes easier for ignorance to conceal itself in technique and pedantry to parade as art.

The acute stage which our civilization has reached in experiencing the practical, social, and psychological problems of specialization is in large part a function of the state of learning in our times. The magnitude of our research activity is appalling, and so is the rate of its flow into the mainstream of learning. The record of the activities of our culture comes close to being total. Every scrap of official data is preserved; every research effort, including Ph.D. theses, is published. The stream of knowledge is a resounding cataract. To cope with it properly one has to select a limited area; to keep up with its course has become an unremitting and exhausting task. Moreover, the state of learning has become so advanced that the extreme boundaries are accessible only to the fully equipped explorers. This is true even outside the sciences. The exact understanding of such writings as the poems of T. S. Eliot or "Finnegans Wake" is no more for the casual amateur reader than is the proper understanding of Einstein.

A surprising and sobering fact about our culture is that, while its total knowledge is vast and of extraordinary refinement and the potential for more—and more recondite—knowledge is apparently inexhaustible, the area of individual ignorance is becoming correspondingly greater. As knowledge in every area increases and as the number of areas in which exact knowledge is possible multiplies, the individual's chances of knowing what there is to be known are radically reduced. This axiom applies not only to the man outside a particular field of learning but also to one in it. Every notable advance in physics, for example, renders not only the nonphysicist more ignorant but also the average physicist as well. In every science we will find good men who modestly concede that concerning some significant phase of their subject they do not know enough to have an educated opinion. We are in a better position than any before us to realize that the pursuit of excellence demands specialization and that the pursuit of specialization creates problems.

Possible Solutions

What solution is there, if any, for this age-old yet characteristically modern dilemma? There are pessimistic answers to that question, and if I had time enough I would enjoy the philosophic luxury of exploring them. However, the human animal being resourceful, its first impulse is to devise means for insuring its survival. In conformity with this normal and admirable instinct, I will try to suggest some possible ways of meeting the problems raised by the advanced state of our technical skills and the accelerating rate of our increase in knowledge. In doing this I shall try to keep in the foreground the special case of the medical profession.

The dangers and limitations inherent in excessive specialization can have more serious consequences for the medical man than, for instance, the electronics expert, not simply because of their possible human consequences but for their professional and scientific consequences as well. In simple situations, the need for a particular specialist's ministrations may be obvious and beyond question, but often it is not and sometimes, even when it is, judgment is required to determine whether that is all that needs to be taken into account. The object of the medical specialist's attention is an individual man, and that means not only that the specialist is dealing with the most complicated of all biological machines but that he is dealing with a being who must make continuous difficult adjustments to an involved social environment and who is the product of a unique personal history. One of the most profound emotional consequences of illness is the patient's troubled and only partial awareness that he has become an isolated object, that he has somehow lost his status as a distinctive, active human being and has been reduced to a thing. The humiliation of the individual by means of ruthless force and brutality has an analogous effect. The compulsive and ritual use of a specialty and the attendant blindness to contingent factors neglects this important aspect of the problem and in doing so interferes with the possibilities of the medical art and science at its best. Good medical practitioners have always been aware in some measure of these aspects of the problem, and I would hazard the guess that one reason for the profound insistence on the moral responsibility of the physician and the appeal to his humanity is that by this means we can inculcate qualities which act as safeguards against the neglect of the total human being and the understanding this approach provides for the nature of illness and its proper care. There is nothing more admirable than the notable efforts of the medical profession to live up to the high moral and humanitarian ideals which have been traditional with it since antiquity. If I contend that the moral and humanitarian appeal is not enough, it is not because I am indifferent to ethical and humane considerations but because as specialties multiply there must be a corresponding increase in the inclination to treat the medical problem as limited and as essentially chemical, mechanical, and physiological and, in consequence, a concurrent inclination to become detached from the total individual human being whose misery is the object of attention. What I suggest, therefore, is that the proper human use of a specialty should be approached as a function not simply of the physician as a good man but of the specialist as a good physician.

There are two possible approaches to the correction of the defects and limitations of specialization as they apply to medicine. One is through the conditions, forms, customs, and organizations which exercise control over the practice of medicine; the other is through the ordering of medical education and training.

One promising development in the practice of medicine has been the increase in the use of teamwork, not merely in the great diagnostic clinics but among smaller groups of closely associated specialists. Moreover, the design and organization of a modern hospital has been shaped by a recognition of the contributions which a large number of skills may be required to make in a given case. To be sure, there is the danger that a patient may become an object in an assembly line and the further danger that divided responsibility may weaken the assumption of responsibility. But, at its best, the collaborative approach avoids the most conspicuous abuses of specialization; it preserves the value of a high degree of individual limited expertness and at the same time maintains a concern for the total human being. It is like a string quartet, in which the individual player demonstrates his own skill best by contributing to the harmony of the whole. There must be, I am sure, equally valuable developments of which I am not aware. The point I wish to illustrate is that dangers and imperfections which arise out of circumstances within a profession must in part at least be countered by establishing modes of association and activity which will reduce the chances of defect or abuse without demanding of each person an exhausting measure of moral and intellectual heroism.

The second approach to meeting the dangers of specialization must be through the training which produces the medical specialist. In the first place, since the outstanding phenomenon of our times is the appalling increase in knowledge, the aim of the training should be not the impossible one of providing for full detailed knowledge and complete experience in all the sciences and techniques that are relevant to medicine but on the basic concepts, the theoretical foundations, and the principles of method which give meaning to the vast data of the various sciences and which make possible their operation and advancement. Moreover, the subjects in the program of studies should be ordered to appear progressively related to one another, so that one step provides the key to the next and not merely the academic prerequisite for getting into medical school or the clinics. We can no longer afford to exhaust the memory, to waste time, to repeat uselessly.

We must also accustom the student from the beginning to the notion that science, in the narrow sense, is not all. On this point I wish to make clear that I am not now concerned with making cultured men out of medical specialists or providing them with outside interests to make them good citizens and with high-grade hobbies to render them less high-strung and more contented. (What do you suppose would have been the response of such men as Franklin and Jefferson to the question often asked of prominent men today: What is your hobby? Their lives seem to have been their hobbies.)

My concern is not with the relation of the medical man to his culture, his society, or his personal happiness, important as these matters are, but with his work as a practitioner and scholar in his field. If it is true that a consideration of the patient as a man in society and as a unique individual is relevant to medicine, we have one good reason for encouraging the medical specialist to temper his exclusive concern with the physical sciences and medical techniques with an interest in other sources of knowledge and wisdom about man. There is a second reason. Originality is not stimulated by narrowness; nevertheless, the specialist has become our chief hope to advance knowledge and improve practice. It has often been observed that progress in the arts and sciences sometimes seems to occur in unexpected jumps and leaps. Analogy is a notoriously undependable means for establishing truth, but I believe it is one of the potent means for promoting discovery and analogy operates best through the intuitive perception of identities in unlike items. The failure to see experience outside the schematism of a limited discipline, whatever it might happen to be, impoverishes the mind. The history of science is dotted with instances which suggest that unusual useful developments in the arts and sciences often originate from a stimulus outside the particular art or science itself.

We should consider it as a hopeful sign that there is so much current preoccupation with the need for broadness in education and so much criticism of narrowness and overspecialization, even though some of this criticism is a trifle hysterical and often ignores the fact that our civilization depends on specialists and that the advancement of learning requires specialization. Some educators, disturbed by the isolation and narrowness of the training programs for advanced specialists, prescribe heavy doses—within the limits of possible tolerance—of courses in subjects quite outside the course of study, sometimes completely remote from the area of specialization. This approach to the problem does not impress me, because it sometimes sounds punitive and self-righteous—like injunctions to take cold baths—and because it ignores the fact that after a certain point in a person's education it becomes increasingly difficult to repair the deficiencies of his past, especially by resorting to methods which are more suitable to the early stages of the educational process. By the time one has reached the final and most advanced stage in his formal training, his task has become too concentrated, his purpose too single-minded, to impose side excursions on him in the expectation that he will be taught a lesson which he should have learned long ago.

Besides, this approach to broadness in the advanced stage of the education of a specialist is an attack on the periphery and not at the center. At this stage, the heart of the matter is the way in which the specialty is taught. It is my impression that all too often the approach is too restricted. It is too often directed toward producing the clever technician and not the educated expert. Too often, the student's attitude is that at last he can settle down to the mastery of a limited and finite body of knowledge and a sharply defined skill. And too often his teachers do not disabuse him. Tennyson wrote a poem about a flower in a crannied wall which concludes, "If I could understand what you are, root and all, and all in all, I should know what God and man is." No doubt a trifle ambitious, but it illustrates the attitude I would wish to adopt in the teaching of any specialty. It has occurred to me, for instance, that if a student of literature really understood all that is involved in the word metaphor he would have to open his mind to many matters, including linguistics, epistemology, the history of criticism, the theory of poetry, and something more besides. And the same might be said for the young scientist who tried to understand all that is and has been implied and contained in the word atom or cell.

The Norse god Thor was once taunted by the giant Utgard-Loki into attempting various tests of strength and prowess. Among them, he was challenged to lift a cat. To his humiliation, Thor found that he could not budge the animal. It turned out that this was no ordinary cat. It was the exposed portion of the fabulous Midgard Serpent whose body encircled the earth. Trying to lift it, Thor had been straining to lift the entire world. I would hope that every advanced student could be made to understand that his specialty is Loki's cat, that what he sees of it above the surface may appear small and easily manageable but that in reality it is necessarily bound to the universe.

THE NATURAL HISTORY OF SPECIALISM IN MEDICINE

Iago Galdston, M.D., New York

Modern medicine and specialism are historically coextensive and all but synonymous. It is understandable, therefore, that the future of medicine is commonly envisaged in the patterns of the immediate past, that is, in the further development and refinement of specialization. Those so persuaded cite the specialties which seem to be springing up before our very eyes, such as enzymology, electrolytic dynamics, and nucleic acid fractionations. In a sort of furor of enthusiasm, they picture the future practice of medicine as an orchestration of virtuosos—each the master of some refined and esoteric department in the clinical score. This vision is enticing, even though it is unrealistic and unhistorical. Essentially, it is foveal in nature, that is, of a pinpoint character and unredeemed by peripheral orientation. It is an uncritical vision that fails to differentiate between the isolated minutiae of research, the extension and perfection of technological processes, and the holism of the practice of clinical medicine.

Unquestionably, research and technology are essential and contributory to the practice of medicine, but the latter is as much above and beyond them singly and collectively as are the creations of the poet and the painter above and beyond the grammarian's rules and the studied properties of pigments and their vehicles.

Without discounting in any sense whatsoever the import of specialization in research and medical technology, it is my intention to submit and to defend the thesis that the future of medicine lies in directions other than the further multiplication and refinement of medical, that is, clinical, specialism.

Whitehead said, "The last thing any science discerns is what it is all about." Medicine is not exactly facing "the last thing," but it is not amiss to try even now to discern what it is all about. To do this effectively, we must first take our bearings—keeping in mind that we are particularly concerned with specialism.

Historical Background

Our orientation needs to be historical, and, consulting the chronicles, we come on a most astonishing fact: specialism, which we are prone to consider a modern feature, was in effect most highly developed when medicine was in its infancy.

Herodotus relates that "besides dentists and oculists the Egyptians possessed doctors who treated diseases of the stomach only, diseases of the head only, and so of other parts of the body; indeed each physician treated only one disease." It is worth noting that in the land of the Nile medicine was completely socialized. Diodorus Siculo says that throughout Egypt the sick were treated without cost, all physicians being employed by the state. As was to be expected, physicians were required to use only the official remedies and in no case to resort

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Secretary, Committee on Medical Information, New York Academy of Medicine.

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to others, unless the authorized prescriptions proved unavailing. Any transgression of this rule of practice, if followed by the death of the patient, was a *capital offense.*

Herodotus lived in the fifth century B. C. and thus was a contemporary of Hippocrates. In this connection we come to another interesting fact, namely, that in Greece there were no specialists. The learned medical historian Charles Daremberg affirmed in his essay, "Sur la division de la médecine" (from La Médecine, p. 454), that the Greek physicians did not even distinguish between the practices of surgery and medicine. "Between the founding of the Alexandrian and the Celsian schools, the most prominent practitioners were at one and the same time physicians and surgeons."

From this juxtaposition of "historical contrasts" in Egypt and in Greece, we can establish the conclusion that *even in its earliest stages medicine exhibited a bipolar trend, one directed toward pluralism and the other toward monism.* These were initially philosophical schools, but they had a profound effect on medicine—pluralism fostering specialism and monism advancing what in modern terminology would be described as the unitary or holistic view of medicine.

The ancient Greek physicians were not unaware of these conflicting trends. In the post-Hippocratic period, that is, between the time of the death of Hippocrates in 357 B.C. and that of Galen in the second century A.D., there came into being a variety of medical schools, each dedicated to the advancement of some singular phase of either the pluralistic or the monistic version of medicine. Thus there were the dogmatists, the empiricists, the methodists, and a host of minor variant schools.

To make sense out of their polemical conflicts is a difficult but not an impossible task, for what, in effect, troubled them was precisely what troubles us today, namely, how to interpret and relate the theory and practice of medicine to the data of human experience.

The monists, among whom we must count both Plato and Hippocrates, argued that the universe, and man within it, comprises a meaningful, integrated entirety which is governed by certain all-embracing principles, accessible to the penetrating intelligence of thinking man. The monists maintained that unless both man and his universe are comprehended in the framework of these embracing principles the crude data of sensation and the ever-current stream of experience can yield nothing but a bedlam of confusion.

In stark contrast to the monists the empiricists, taking Aristotle as their intellectual leader, rejected all speculative theories and dedicated themselves solely to the cure of disease. Their motto was "not to understand disease but remove it."

The issue of pluralism and monism was in some measure reconciled in Galen. Galen's "Treatise on Medical Experience" begins with the affirmation, "When I take as my standard the opinion held by the most skilful and wisest physicians and the best philosophers of the past I say: The art of healing was originally invented and discovered by logos in *conjunction with experience. And today also it can only be practiced excellently and done well by one who employs both of these methods."*

This is patently a noble and yet palpably a naive affirmation. For it takes experience for granted, as if experience were self-revealing, transparent, and intuitive to human intelligence. Hippocrates was not that naive. He knew that experience was deceptive and that its "deception" could not be laid bare by the unsophisticated logos. Something else was requisite, a philosophical orientation or, as it was later termed, "logos harnessed to a method."

The logos of man did not formulate this method in a definitive form before 1636. It was then that René Descartes published his "Discours de la méthode."

Descartes was not the only proponent of the thesis of this work. Among his precursors were Thomas Hobbes, Giordano Bruno, and Francis Bacon. This thesis, witnessed in the illuminating achievements of Descartes' contemporaries Galileo and Harvey, may be summed up as follows: to broach experience, not in its most complex but in its simplest and most elementary components; to explore these by the methods of experimentation, that is, by the artful structuring of experience for preconceived goals; and to mensurate the resulting information in quantifying terms, that is, mathematically.

This, as I am sure you must appreciate, is *essentially empiricism resurgent—but in a new* and novel form. It is pluralism *de novo* and specialism *in statu nascendi.*

Bacon and Descartes were philosophers rather than scientists, and yet their respective works served to discredit rather than to advance philosophy. Thereafter, among the learned, the scientists outnumbered the philosophers, and nature which to the Greeks was, in itself, simple was in time dismembered and parceled out among a host of "natural scientists," workers in special disciplines.

This brings us to the threshold of the 18th century, the age in which modern medicine was born. It was signaled in the final overthrow of Galen's authority. The assault on this authority began more than 150 years before, in the first half of the 16th century, with Paracelsus as its leader. It was consolidated in the "Fabrica" of Vesalius (1538) and in the "Motu Cordis" of Harvey (1628).

The foundation of modern medicine rests on the study of anatomy, the detailed and correct exposition of the structure of the human body. This pursuit, making common the practice of dissection and defining the norms of the body's organs, in time made possible the study of gross pathology. Autopsies, prosections to demonstrate the anatomic concomitants of disease, became commonplace. The science of pathological anatomy was founded on the monumental labors of Giovanni Battista Morgagni, whose "De sedibus et causis morborum per anatomen indagatis" was published in 1761. But note the title of Morgagni's work. It was not merely *de sedibus,* the seat, but also *de causis,* the causes of disease. This points to new developments, to the anatomically oriented nosology and nosography. The linking of symptoms to organic changes, and by indirection to altered function, could not but yield many refinements in diagnosis, prognosis, and therapy. Such was indeed the result. What began as gross pathology was advanced and developed by a host of ingenious men and yielded in time (but before Virchow established the science of cellular pathology) subtle and penetrating insight into the morbid processes of the diseases affecting the major systems. In this connection, Richard Bright, William Stokes, James Parkinson, John Cheyne, Theophile Laennec, and others, by their singular knowledge and expertness, became in effect the prototypes of the modern clinical specialist.

As the medical historian Arturo Castiglioni affirms, "At the end of the 17th century, when the cooperation of medicine and the natural sciences was being emphasized, we already see outlines of the essential features of the great structure of experimental science. Already various specialties began to be detached from the main trunk. . . . Here we have an extensive preparation for modern medicine."

Recently I wrote an analysis of the history of specialism entitled "The Birth and Death of Specialties." (*J. A. M. A.* 167:2056–2061 [Aug. 23] 1958). I will repeat but little of the argument presented there, for I would rather take a closer look at specialism itself and speculate on its future and the bearing it may have on medical education.

It is of interest that medical specialism was first pursued mainly by the laity. The lens coucher, tooth extractor, lithotomist, bone setter, midwife, masseur, and barber surgeon were the specialists of the middle ages and later. It is a significant archaism that in England the surgeon is addressed as "mister" rather than "doctor" and that it was said of John Hunter that "he made gentlemen out of surgeons." As can be gathered by this catalogue of specialists, they, the specialists, were the doers, the operators. They were, as so many are today, technicians, men skilled in crafts rather than knowledgeable in theories.

It is of interest, too, how much of specialization is dependent on instruments and instrumentation. Historically, many specialties were literally made possible only when the effective tool came to hand. The classic example is the ophthalmoscope. Another is the roentgen tube. It is not too much to postulate that the tool made the specialist no less than the specialist the tool.

Components of Medicine

Thus, in the broadest sense, medicine embraces two major components, a *gnosis* and a *techné. Gnosis* is medicine's knowledge and understanding of man as a living creature surrounded by many and varied realities. *Techné* embraces all the operational modalities used by the physician in his efforts to benefit man.

During the past 150 years, the *techné* of medicine has tended to overshadow and to outstrip its *gnosis,* even though the latter has grown immensely. This, I am persuaded, is the result of two contributing factors: the phenomenal growth of the technological sciences in general and the vast and ever increasing demand for what I term episodic medicine.

The practice of medicine, as I see it, is divisible into two major categories: episodic and maintenance. Episodic medicine, as the term implies, is the medicine practiced in emergency situations, best exemplified in the surgeon's work. Maintenance medicine is devoted to fostering the everyday well-being of the individual. It is best represented in the practices of the pediatrician and the nonspecialist internist.

Episodic medicine is primarily and predominantly the realm of the specialist, and he in turn is the master of medical *techné.* Maintenance medicine calls for less *techné* and for a deeper indoctrination in the *gnosis* of medicine.

Implicit in the above definition of *gnosis* are the monistic overtones of Hippocratic medicine, for I identify modern specialism with the pluralism of the empiricists. But specialism is not thereby disparaged. That were indeed a folly, if for no other reason than that, as I have indicated, present-day living is beset with numerous emergency episodes, not all of them surgical in character. My intention is not to belittle the *techné* of medicine but to plead for a better and wider comprehension of the *gnosis* of medicine, both among those who practice episodic and among those who practice maintenance medicine.

Today, however, all the emphasis is on *techné.* Even our undergraduates in medicine receive their instruction as a sequence of specialty parcels. In most medical schools the current curriculum is a recapitulation in four years of the historical development of medicine during the past 400 years. The result is that the graduate comes forth schooled in the thought that the practice of medicine consists of discovering what the patient has and what is good for it. A really basic comprehension of biology is rarely encountered. Chemistry, being a must, is fairly well known, but general physiology is not. Ask the young graduate to describe what effect exercise has on lymph circulation and tissue nutrition and to speculate on what bearing this may have on metabolism, and you are likely to have a blank stare for an answer. Ecology will most likely be a familiar term, but not its full significance to the understanding of the patient's history. Of medical history the young graduate is likely to be blissfully ignorant. To sum it up, in education, as in practice, the accent appears to be on *techné,* while the need is for *gnosis.*

Future of Specialism

I have said that specialism is here to stay, but not that it will stay the same. Specialism is, in effect, confronted by the challenge of its own technological instrumentalities. I cannot envision automation taking over the surgeon's work, but it may well take over that of his anesthetist. Certain it is that, increasingly, the diagnostic laboratories with their multiplicity of apparatus are taking over more of the tasks in the exercise of judgment and discrimination formerly performed by the specialists. I am also convinced that an even greater challenge to specialism lies in the deepening penetration of the physiological sciences into the mysteries of normal function. I need only call in witness the effects which the science of nutrition has had on a host of specialties.

Thus far I have treated of specialism as a phase of the growth and development of medical knowledge. But specialism has a social as well as a scientific aspect. There are, in other words, specialties and specialists, and the derivation of the practitioner-specialist may be "a thing apart" from the specialty he practices. Historically, the specialty, as a compact cluster of particular knowledge, antedated the advent of the practitioner-specialist. Laennec knew a great deal about chest diseases, but he was not a lung specialist. Richard Bright knew more than any of his contemporaries of the chronic disorders of the kidney, but he was not a urologist. William Stokes of Dublin wrote treatises both on diseases of the chest and on diseases of the heart and aorta, but he was first and foremost a clinician and not a specialist.

Granted there was not too much to be known in any of the specialty fields, so that any gifted and studious physician could be both expert in one department of medicine and competent in the rest. But that is precisely the point I wish to underscore. When, in the early stages of specialism, a physician became a specialist, he more than likely had come to his specialty through years of work and experience as a generalist. Such, of course, is not currently the case. Men set out to be specialists before they have completed their undergraduate training. Despite the seemingly reasonable plea that medical knowledge is too vast and too complex for any one mind to encompass it, and, hence, specialization is inescapable, I am persuaded that much specialization is motivated by less cogent and more worldly reasons. I would feel more reassured if I saw the neophyte specialist cramming himself to the limit of his capacity with the knowledge basic to a sound comprehension of medicine.

It is certain that the specialist has operated in what may be called a scarcity market. It is not likely to continue as such indefinitely. Specialism in its social and economic aspects must sooner or later come under the sway of social and economic determinants. It is likely to be less rewarding economically and to offer less prestige. This, too, may lead to a coalescence of some of the specialties into larger and more inclusive divisions of clinical medicine.

Though medicine has prospered enormously during the past 200 years, in an era of increased and refined specialization, one is not warranted in envisaging the future of medicine in a like perspective. I think rather that, while specialism will remain an important division of medical service, medical science per se and medical service perforce will undergo a revolutionary change. The change will be the result of the maturation of the knowledge and intelligence to be derived from the disciplines of physiology and ecology.

Ecology, I am certain, does not call for detailed definition. However, physiological medicine does; it is too easily confused with the physiology of the smoked drum variety. Physiological medicine is, in my definition, the operations of the organism set in its environment. Exemplary of physiological medicine is the magnificent discipline of nutrition—magnificent in the true sense of that term, "doing great deeds" or characterized by "greatness of achievement." To the credit of the science of nutrition stands the true conquest of pellagra, beriberi, rickets, scurvy, chlorosis, and a host of other disorders and diseases.

Within the ambit of physiological medicine lie a multitude of factors which are requisite to the optimal operations of the living organism. And there is, as you must perceive, a most intimate interrelationship between ecology and physiological medicine.

Conclusions

I have ventured some prognostications as to the future of medicine. These prognostications are neither as wild nor as hazardous as they may appear to be. It lies inherent in the developmental process of every science that after a period of wild and florid growth it matures into a consistent and meaningful discipline, compact in principle and pervasive in application. It is this I am sure Whitehead meant when he said that the last thing any science discerns is what it is all about.

Medicine has experienced 400 years of specialism, in the last 150 to a most intensive degree. We are now, I am persuaded, on the verge of that stage wherein the emergent unifying principles of the biological sciences, reflected notably in the disciplines of physiology and ecology, promise to make of medicine a consistent and meaningful discipline compact in principle and pervasive in application. This matured medicine, enriched in *gnosis*, will subserve and enlarge the operations of maintenance medicine and will correspondingly make less requisite those of episodic medicine. I respectfully submit that it would be well for those charged with the education and training of our future physicians to pay heed, to prepare, and to foster this promise of the future.

2 E. 103rd St. (29).

THE CHALLENGE OF SPECIALIZATION IN BASIC MEDICAL SCIENCE

S. Marsh Tenney, Hanover, N. H.

Successful scientific investigation has thrived with the motto "divide and conquer." Only by dividing and subdividing major problems into manageable parts has it been possible to obtain definitive data which, when interpreted, could be resynthesized to answer the original question. Overwhelming testimony provided by the history of science has affirmed this fundamental technique, but at the same time there has arisen a criticism broadly recognized as a limitation of general discovery which is apparantly the product of the classic strategy. We need only recall the trenchant analysis of Slawkenbergius' treatise on noses to sense the caricature of specialization in the public mind. The basic issue, then, is not whether specialization has been or will continue to be necessary to the advance of scientific knowledge but, rather, whether there is some feature implicit in the system which has been detrimental to the greater good.

Specialization Leads to Generalization

Whitehead has stated, "The subjects pursued for the sake of a general education are special subjects specially studied; and . . . one of the ways of encouraging general mental activity is to foster special devotion." We should expect, however, that specialized investigation not only would lead to a detailed and precise definition of a phenomenon but, by nature of its completeness, should be developed into profound general truths that stand antithetically to the rigid and restricted concept of "specialization." "The essence of knowledge is generalization" (Whitehead).

The boundaries between the subdivisions of science are artificial and should largely disappear as a deeper insight into fundamental phenomena is acquired. The sterile cul-de-sacs of research are not implicit in the method but are human—an unwillingness on the part of the investigator to interpret broadly and imaginatively. Who could label Claude Bernard a specialist on electrolytes? Yet it was through a detailed examination of these chemical minutiae that he formulated one of the few existing basic "laws" of biology, that the existence and constancy of the physicochemical properties of the body fluids is a necessary condition for the evolution of free and independent life. Quite clearly, there is a point in investigation where the vertical pursuit suddenly broadens into a wider understanding, and it is at this juncture that the gifted few find general expression for hitherto unknown relationships.

The question must be posed as to whether something has transformed the boldness of spirit which should be the heart of research into a timid reluctance to explain new observations outside conventional dogmas. Is there an increasing "lack of discrimination between the details which are now irrelevant and the main principles which urge forward human existence"? I believe that, unfortunately, both these questions must be answered in the affirmative and that the problems arise simultaneously with an attitude accompanying increasing specialization. There has resulted a changing pattern of specialization which is both the product of the times and an instrument in perpetuating its own weakest points.

One of the challenges of graduate education in the basic sciences is that of providing the student with sufficient familiarity in a variety of topics so that he can range effectively over accepted boundaries without the stigma of dilettantism yet be sufficiently well informed in at least one field to become expert in it. Many of the most exciting problems in modern biology and medicine lie in the "in-between" areas, and their solution is more likely to come from the man whose training and outlook are broad. I submit that both training and outlook are of equal importance.

The following apology quoted from the first paragraph of a recent scientific paper emphasizes the conservative scholar's preoccupation with the boundaries of his own range of knowledge. "It carries me out of my field, and off of ground on which I feel secure; it may prove again only that a little knowledge is a dangerous thing." Erasmus, sensing this problem long ago, offered the following advice suggesting that folly might constitute the necessary ingredient for a renaissance: "For there are two main obstacles to the knowledge of things, modesty that casts a mist before the understanding, and fear that, having fancied a danger, dissuades us from the attempt. But from these folly sufficiently frees us, and few there are that rightly understand of what great advantage it is to blush at nothing and attempt everything."

Medicine began to acquire stature as a science when, instead of knowledge appearing as a by-product of the solution of immediate problems, deliberate efforts were made toward the enlargement of knowledge by test cases selected toward that end. In general, the development was from common-sense knowledge, but its growth depended on

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Director of Medical Sciences and Professor of Physiology, Dartmouth Medical School.

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the assumption that there was more to know than the context admitted and that there were assured ways the unknown could be discovered. It has been said by Hawkins, "Nature is not directly amenable to the forms which an artist or scientist may choose or invent. Changes of style may open up new areas of subjects, or the concern with new subjects may force the development of new styles." One of the lasting tributes to the genius of the great classic figures in medical science is the skill they displayed for inventing not only new techniques but often whole new concepts in fields quite outside their own area of specialized interest when the solution of the problem at hand demanded it. They set an enviable record by their contributions to the sister sciences when the [illegible] could not be solved readily by the application of physical laws known at the time. Physics is richer for the *contribution of Helmholtz to the theory of sound*, for the precise experimental definition of the laws of fluid flow by Poiseuille, for a quantitative description of the elasticity of solids by Young, for the first statement of the first law of thermodynamics by Mayer. Even the founder of the *American Journal of Mineralogy*, Archibald Bruce, was a physician. There may have been humility, but the record would not suggest any timid reluctance on the part of these men to advance into areas far out of their field, work toward and arrive at a solution, then return with their new knowledge to the biological problem which stimulated their departure. But the climate has changed. It is almost unthinkable now that a medical scientist would dare to risk creative activity in any other area of the life sciences, let alone in the physical sciences. Indeed, there is even some reluctance to learn what is currently known in these disciplines, let alone what is unknown. Rather, the solution would seem now to be as simple as adding one more "specialist" in the personnel category of a research grant application and congratulating oneself not only that the "team" is nearing completion but also that medical educators will be satisfied the approach is "modern" because it shows evidence of "multidisciplinary integration."

In attempting to bridge the gaps created by established, specialized interests, one must be careful that a new specialty does not arise just to fill the gap. Such specialties start with a credo affirming virtue in breadth but quickly mature with horizons confined to the limits of the gap.

Biophysical Feedback

The biological scientist is struggling with increased vigor to learn and to apply to living systems knowledge from the physical and mathematical sciences. The importance of this association is widely recognized and appreciated, but the significance to the broader aspect of biological thought must not be lost from sight. Any direct imitation of the physical sciences must be accepted as a sign of immaturity. The 17th century was an instructive period, filled with enthusiasm for the conversion of medicine to chemistry and physics. The science of mechanics was in its heyday, and it contributed immensely to the understanding of the circulation recently discovered by Harvey. Still, the era ended with disillusion and a cry for the return to Nature. The balance had been lost—too much was expected to follow from imitation, a lesson confirmed by the failure of Linnaeus' attempt to classify diseases according to his scheme.

There is every confidence that living systems will be described ultimately in a mechanistic rationale, but it is also not unlikely that certain unique features in living systems will escape known concepts developed exclusively around phenomena of the inanimate world. There is a difference between *returning to the physical sciences for basic* concepts on the one hand and becoming slavishly dependent on the other. It is still likely that certain fundamental concepts in biology properly fed back into physics will provide suggestions of mutual advantage. This must have been what Sullivan, the mathematician and physicist, had in mind when he said: "The great intellectual conquests of the near future, the next great step forward in the development of human consciousness, may be expected to come from biology." For analytical purposes the parts and processes are legitimately treated in isolation and within the established concepts of physics and chemistry, but too often sight is lost of the fundamental role of organization in biology—that the unified whole is more than the sum of the parts—aptly put by Muller: "To say for example, that a man is made up of certain chemical elements is a satisfactory description only for those who intend to use him for fertilizer."

One of the great weaknesses in biology is its paucity of "laws." Even bad laws are useful, for they provide a framework on which to construct. Formalization is urgently needed, but imitative response is not enough. Unfortunately, biology has yet to find its Newton.

If we accept that the mental attributes of the contemporary scientist are equal to those of his ancestors, then there remain several factors which provide significant barriers to productive generalization. The enormous complexity of current scientific knowledge is a formidable obstacle, and no one would disagree that it is too much to hope that any mere mortal could master even a segment. In spite of this, it seems to me there is reason for optimism, for inevitably the final expression of great generalities tends to be disarmingly simple.

A second deterrent is one for which I feel specialization is directly culpable, although the vanity of man is a necessary ingredient. It may also be that the social structure which has bred "organization man" provides a milieu in which the inherent weaknesses of specialization flourish. A caste system in science is not new, but I believe that more recently there have increased two unfortunate products that weaken the basic goal of research. These are scientific snobbery and the establishment of cadres of secrecy. The former may be a part of the social constitution of man and the latter, in part, a consequence of poor communication because of the development of jargon, but both create an atmosphere in which worthy or relevant information can be considered to evolve only from the next "higher" science. The chemist G. N. Lewis has beautifully described the situation as follows: "The man whose chief apparatus is the differential equation looks down upon one who uses the galvanometer, and he in turn upon those who putter about with sticky and smelly things in test tubes. But all of these, and most biologists too, join together in their contempt for the pariah who, not through a glass darkly, but with keen unaided vision, observes the massing of a thundercloud on the horizon, the petal as it unfolds, or the swarming of a hive of bees. And yet sometimes I think that our laboratories are but little earth-works which men build about themselves, and whose puny tops too often conceal from view the Olympian heights; that we who work in these laboratories are but skilled artisans compared with the man who is able to observe, to draw accurate deductions from the world about him."

Charity and an appreciation for good science from all sources is less apparent. We need a realization that pedestrian physicochemical measurements on a blood protein are neither more sophisticated nor more fundamental to the advance of medical knowledge than an accurate description of a new syndrome arrived at through patient observation at the bedside. No one is so omniscient to foresee where the missing links for a rational description of the fundamental truths of life will appear. To avoid intellectual segregation is difficult at best, but to deprecate knowledge from any source, deliberately, betrays an unforgivable provincialism. Modern specialization, fostering security in a tight little compartment, tends to reduce the scientist to a petty role, but it is my contention that the destructive forces concerned are primarily social and psychological, not intellectual. The specialist becomes a sharp critic of those who threaten his domain, and the would-be pioneer tends to be recast as an intruder. Rather than risk derision for venturesomeness the specialist takes refuge in his own compartment—thus creating a self-perpetuating scheme.

Conclusions

An objective of graduate education in the basic medical sciences is to provide sufficient training in the physical and life sciences that the student can work competently and confidently with the concepts and techniques fundamental to a study of mechanisms of all life phenomena, irrespective of specialty. The challenge is to add to this an intensive period of study and investigation on a particular problem without sacrificing breadth of outlook. The attitude of his teachers is the single most important factor toward this end.

HAZARDS IN PLURAL BIRTH.—The chances of being born alive and of surviving the first year of life are distinctly less for children in plural births than for the single-born. Furthermore, the hazards are greater for triplets than for twins and greater for quadruplets than for triplets; the survival of a set of quadruplets is a rare event. Plural births account for only 2% of all births in the United States but are responsible for about 6% of the fetal deaths (still-births of 20 or more weeks of gestation) and for nearly 10% of all infant deaths. . . . The fetal death rate among twins in the United States in 1956 was 43.6 per 1,000 born alive or dying during the fetal period, compared with a rate of 15.6 per 1,000 for the single-born; for other plural deliveries the corresponding rate was 80.6. Data available for twins show a particularly high fetal mortality among those born to very young mothers and to mothers at ages 45 and over, but even those born to mothers in the age range 20-44 years experience a higher fetal death rate than the single-born. . . . Whether or not a mother has had children previously is also a factor in the mortality experience of infants born in plural sets. A recent study in Iowa showed that both the fetal mortality and the neonatal death rate (mortality in the first four weeks of life) generally decreased with increase in parity of the mother. . . . Deaths ascribed to prematurity account for about half of all neonatal deaths among children in plural births, a rate approximately 9 times that for single births. . . . Irrespective of birth weight, both fetal and neonatal death rates are higher for the second-born of a twin set than for the one born first. Much of the difference is attributable to the disparity in mortality from birth injuries and postnatal asphyxia. Identical twins experience somewhat higher neonatal death rates than fraternal twins.—Hazards in Plural Birth, *Statistical Bulletin of the Metropolitan Life Insurance Company*, November, 1958.

THE EFFECT OF SPECIALIZATION ON GRADUATE EDUCATION IN SURGERY

Herman E. Pearse, M.D., Rochester, N. Y.

Specialization is so widespread that it permeates every phase of our society and has resulted in many of the material and scientific advances in recent years. Only when specialization is premature or is dissociated from the whole does it have an adverse effect.[1] This is as true of the mechanic who tightens one bolt on an assembly line as it is of the physician who gazes into only one orifice of the body. Such restricted specialization permits a rapid acquisition of the skill necessary to perform the limited task, so there is no need for the laborious and time-consuming process of acquiring an understanding of its integration. In former years the position of a specialist was attained only by superior intellect and experience directing observation or experiment to increase medical knowledge. This authoritative position attracted students who came to learn from the master. In the United States Halsted[2] formalized this relationship by creating what we now call the residency system of training. Soon after, Mall implemented full-time clinical training.[3] These changes have had a profound effect on subsequent medical education.

Halsted and others fostered the development of special fields in surgery. This was accelerated by World War I, especially in the areas of orthopedic and plastic surgery. Soon after, the subspecialties of orthopedics, urology, neurosurgery, plastic surgery, otolaryngology, and ophthalmology were well developed, with residents in training, at Johns Hopkins University School of Medicine. Specialized residency training was initiated in other teaching institutions and expanded rapidly. After World War II it spread to many nonteaching hospitals so that specialization was put on a production line basis by establishment of credit for training and the award of a certificate. This rapid increase in specialists has made a great change in the practice of medicine.

There are many ways to explore the effects of increased specialization. It was decided to examine only the educational changes because the way special skills are acquired will influence how they are practiced. To make this study more specific it was limited to surgery, with our teaching hospital as an example, and it was restricted to the period 1927-1928 to 1957-1958, which is the period of my tenure at that institution.

The Strong Memorial Hospital, Rochester, N. Y., is owned and operated for teaching by the University of Rochester. When it opened in 1925, there were 246 beds, of which only 26 were for private patients. In 1936, a private floor of 14 beds was added and semiprivate patients were admitted to the wards with the understanding that they would be used for teaching. In 1941 a private wing was built, and in 1949 a psychiatric clinic was added. At present there are 257 semiprivate and ward, 128 private, and 74 psychiatric beds, a total of 459. The Rochester Municipal Hospital is owned by the city of Rochester but is operated by the university under contract. Its building is a part of the medical center, and the two hospitals are operated as one unit. In 1925, the Rochester Municipal Hospital had 209 beds, which were increased to 321 during the depression (1936) and now total 302. Thus, there are a total of 761 beds, excluding 41 bassinets, in the two hospitals which constitute the basic teaching unit of the medical school.

During the period after World War II so many of our men required completion of their training that it was necessary to use other clinical facilities. Experiments in assigning residents to "affiliated" hospitals were tried. Some of these hospitals were outside the city, in Clifton Springs, Ithaca, Canandaigua and Batavia, N. Y., and in Bradford, Pa. For various reasons all of these have been discontinued except for the Veterans Administration Hospital (257 beds) at Batavia, N. Y. At the same time affiliations were made with hospitals in Rochester, N. Y. These have now narrowed down to a cooperative, coordinated program for the first two years of "general training in surgery" with the Genesee Hospital (252 beds) and the Highland Hospital (242 beds), both of which are fully accredited, four-year, surgical training centers having their own interns and third-year and fourth-year residents. This pooling of clinical resources has given a broader experience than could be offered by any one of the hospitals alone. The combined bed capacity is 1,512, and experience is given in community, teaching, and government hospitals.

In subsequent discussion, the size of the resident staff at the Strong Memorial and Rochester Municipal hospitals is always given as a corrected figure which represents only the residents working in those two hospitals. Any men assigned elsewhere have been subtracted from the total. Data are tabulated by academic years beginning July 1, but for brevity the nomenclature for fiscal years is used. Thus, 1957-1958 becomes 1958.

During the 30 years covered in this study, profound changes have so altered graduate medical education that it has become increasingly difficult

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From the Department of Surgery, University of Rochester School of Medicine and Dentistry.

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for educators to achieve the level of competence which they desire for their students. Some of the factors which have caused these changes are more rigid definition of the specialties, the creation of certifying boards designed to evaluate competence but often dictating the educational experience leading to it, the increased regulation of teaching hospitals by medical and surgical societies, the impact of medical insurance which has depleted the wards of the teaching hospitals, and, finally, the disruption of education by two wars and obligatory military duty in peacetime. An effort will be made to analyze the effect of these on our teaching hospital.

TABLE 1.—*Residents for 1928-1958 in General Surgery and Specialties, with Total Number of Operations and Operations Done per Member of Resident Staff*

Yr.	General Surgery Residents, No.	A.R. General Surgery, No.*	Residents in Subspecialties, No.							Total No. of Residents			Operations, No.†	Operations per Resident, No.
			Oral	Orthopedic	Genitourinary	Eye	Nose and Throat	Neurosurgery	Plastic	General Surgery	Subspecialties	Both		
1928	1	4								5		5	2,872	574
1929	1	4								5		5	3,181	636
1930	1	4								5		5	3,861	772
1931	1	5								6		6		
1932	1	5								6		6	4,832	805
1933	1	5	1	1	1	1	2	1		6	7	13	4,895	377
1934	1	5	1	1	1	2	2	1		6	8	14	4,143	296
1935	1	5	1	1	1	2	2	2		6	9	15	4,555	304
1936	1	5	1	1	1	2	2	2		6	9	15	4,706	314
1937	1	5		2	2	2	2	1		6	9	15	4,832	322
1938	1	5	1	2	1	2	2	1		6	9	15	4,879	325
1939	1	5	2	2	2	2	2	1		6	11	17	5,057	297
1940	1	5	2	1	2	2	2	1		6	10	16	5,084	318
1941	1	7	2	1	2	2	2	1		8	10	18	5,349	297
1942	1	7	1	1	2	2	2	1		8	9	17	6,100	359
1943	2	7	1	1	2	2	2	2	1	9	11	20	5,520	276
1944	1	6	1	1	2	1	1	1		7	7	14	5,258	376
1945	1	6	1	1	1					7	3	10	5,205	521
1946	1	4	1	1	2	2		1		12	11	23	5,783	251
		7‡		1		1	2							
1947	2	9	1	3	3	2	4	2		11	15	26	5,423	209
1948	1	11	2	2	2	3	4	1	1	12	15	27	6,861	254
1949	2	10	1	5	2	2	4	1	2	12	17	29	7,066	244
1950	2	11	1	6	3	2	3	1	1	13	17	30	6,880	229
1951	2	10	1	5	3	2	3	1	1	12	16	28	6,960	249
1952	2	10	1	4	3	2	2		1	12	13	25	8,002	320
1953	2	11	2	4	3	2			2	13	13	26	7,337	282
1954	2	12	1	4	4	2	2		1	14	14	28	7,345	262
1955	2	12	3	5	2	2	1			14	13	27	7,079	262
1956	2	12	3	6	3	1	2		1	14	16	30	7,544	251
1957	2	12	2	5	3	3	2	1	1	14	17	31	7,376	238
1958	2	12	2	6	3	3	2	1	2	14	19	33	7,277	221

* Includes 1 laboratory A.R.
† Some gynecologic operations included through 1933 only.
‡ Additional men returning during 1946.

Growth of Specialized Training

Many members of our original faculty had been at Johns Hopkins University, so it was natural that heads of each special division of surgery should be appointed. Specialization did not extend to the resident staff, for in the beginning the general surgical residents were responsible for all cases. This was not satisfactory to those in charge of the special divisions, for they wanted their own graduate students. In 1933, residents were appointed in the subspecialties of surgery, and since that time their number has steadily increased. This is shown in table 1 and illustrated in figure 1, where the part played by general surgery and the specialties is related to the total. This shows how the subspecialties were hit hard during the war and rebounded after it. But it is evident also that as the wave of postwar trainees began to subside it did not return to its former level due to the requirements of certifying boards. At first the cost of this increased staff was borne by veterans' benefits, but now it must be paid by the institution, which creates a heavy expense despite inadequate salaries.

It is desirable to relate these changes to activity or experience. This can be done by using bed capacity, admissions, or patient days, but in surgery operations performed is probably the best index. In figure 2 the increase in operations is plotted against the growth of the surgical resident staff. At the end of the war there were men from the classes of 1938 to 1945 who all returned at once to complete their training. This elevated the curve of resident staff above that for operations. Now, with the increase in specialty residents, this has recurred. If the operations performed are divided by the number of residents, a ratio of operations per resident is obtained which may be used as a general index of experience. This is shown in **figure 3**, where it is seen that this ratio was very high in the early days when the general surgical residents were responsible for all cases. It was 772:1 in 1930 when I was resident. This meant long hours and hard work but a golden opportunity for training. However, this situation was inadequate for the needs of the service, and a better balance was obtained when residents were appointed for the subspecialties. This dropped the ratio to about 300:1 where it remained until the war. Recently, it has dropped to 221:1 as more residents were added. It is difficult to evaluate what is required for a rewarding experience, and, certainly, no one factor can be used as a gauge. The minimum number of residents is easily arrived at because it is fixed by the board requirements of the various specialties. For example, if two, three, or four years of specialized training is stipulated then there must be two, three, or four men going up the ladder to the chief residency in these specialties. If general surgical training is required before specialization then there must be a man for every year specified. To these are added the number aiming at a career in general surgery, and by simple arith-

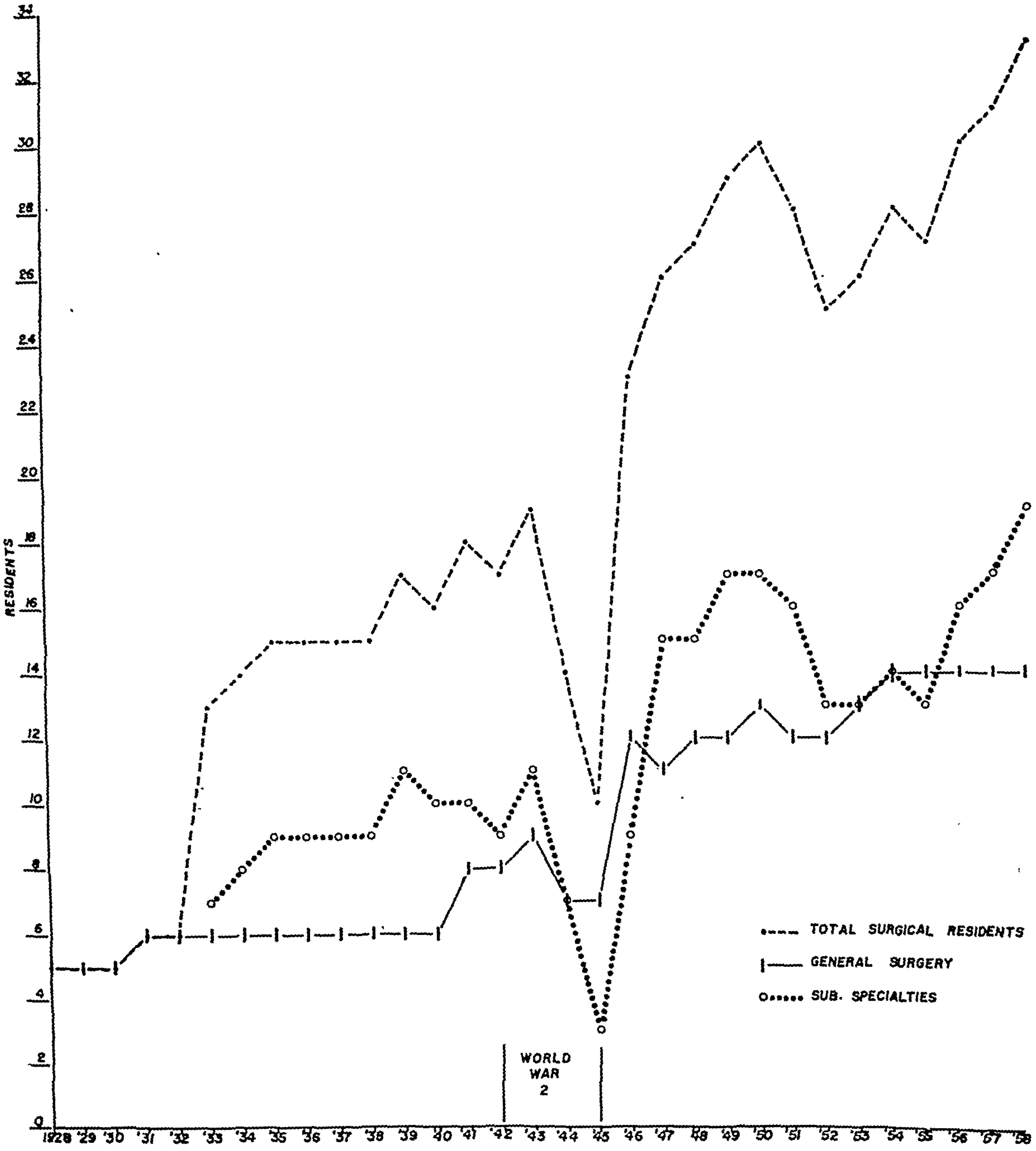

Fig. 1.—Growth of surgical resident staff at Strong Memorial Hospital, Rochester, N. Y., 1928-1958.

metic we arrive at a total. It should be emphasized that this is an educational, not a service, requirement, so it may bear little relation to clinical work load. Some insight is gained by a study of discharges (an index of patients treated), which is given in table 2, and for patient days (an index of bed occupancy), shown in table 3. That these reflect differences in the type of work load is apparent by comparison of the percentages in the two tables for otolaryngology and orthopedics.

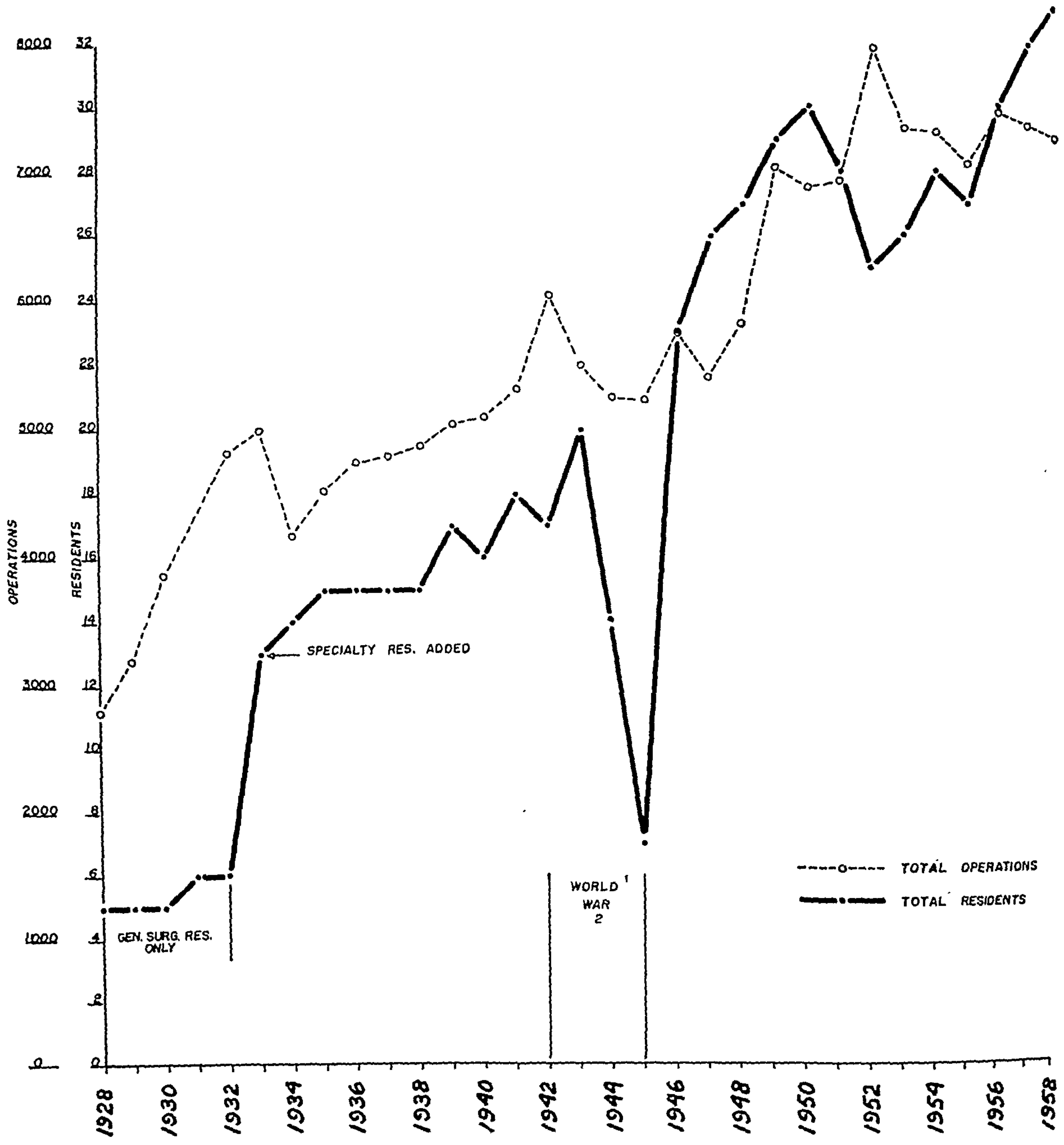

Fig. 2.—Relationship of increase in number of residents to operations performed at Strong Memorial Hospital, Rochester, N. Y., 1928-1958.

Increased Segregation of the Specialties

These figures give some insight into the growth of specialized training, but they fail to tell the whole story. The prewar subspecialty residents had extensive general training in surgery before they, alone, were in charge of their specialty. For example, in orthopedics four men had been senior or chief resident in general surgery prior to their appointment as orthopedic resident. There were few restrictive regulations, so that only proficiency in their field was the aim; with their surgical experience this was rapidly acquired. Patients of all specialties were admitted to the 32-bed wards which were designed with a four-bed cubicle as the largest unit. Interns were assigned in charge of these floors, with students as the clinical clerks. This gave a cohesive, smoothly functioning service for clinical care and teaching. But World War II changed that.

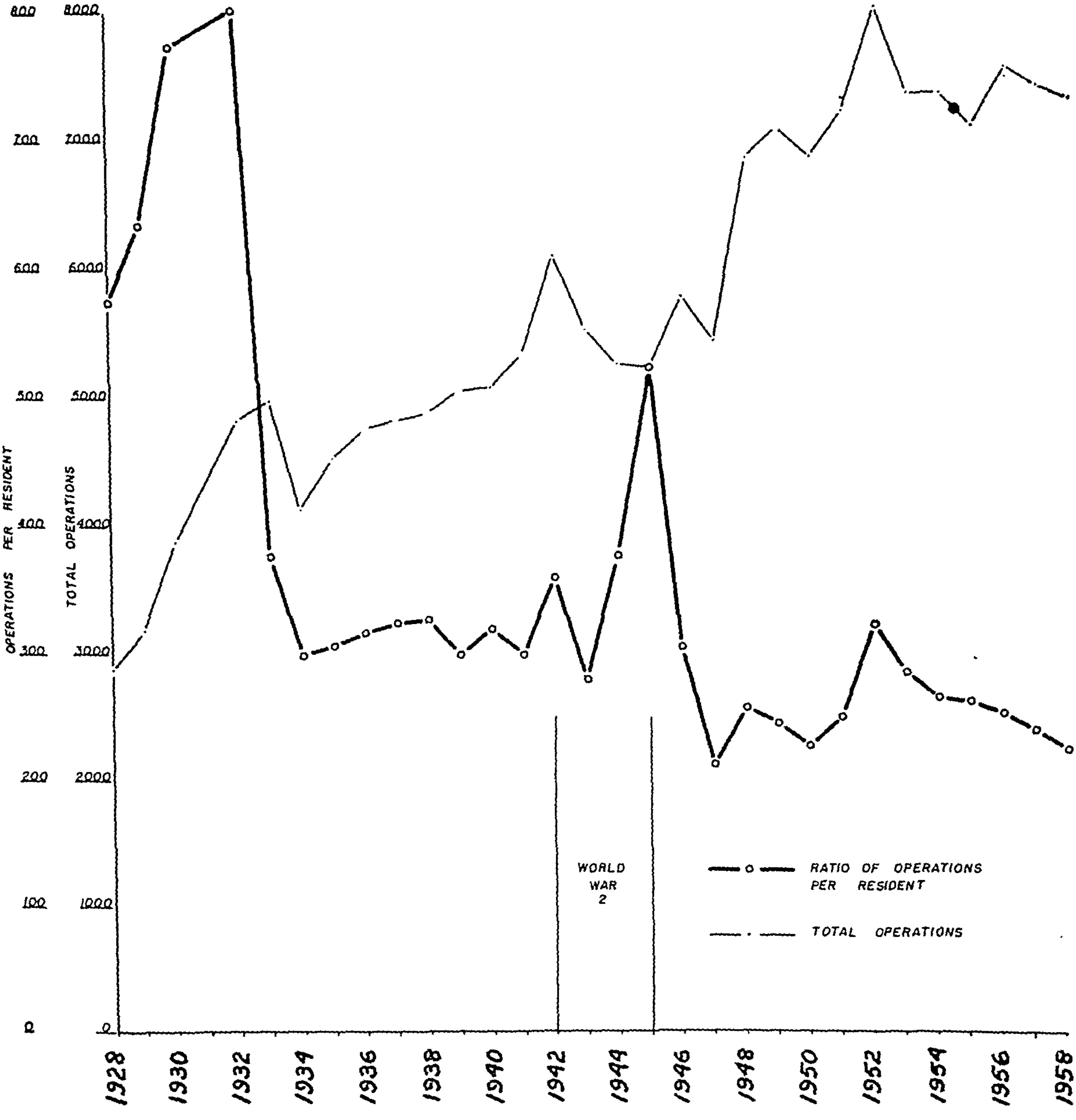

Fig. 3.—Ratio of operations per resident at Strong Memorial Hospital, Rochester, N. Y., 1928-1958.

The certifying boards were well established in the decade after 1930, but they had not assumed their present importance. The armed services chose to use board certification as the yardstick for specialized assignments which carried higher rank and more rapid promotion. Those who did not have certification observed this, and on their return they unanimously said "I want my boards." Meanwhile the boards defined residency training as the acceptable way to competence. Preceptorial training was largely abandoned. The period of subspecialty training was lengthened. This increased the number of specialty residents who formed a team and tended to restrict their activity and interest to their own field, splitting the service into several separate groups. But the interns and students were still assigned to the surgical floors where all patients were admitted. Now they had to deal with many more residents who were usually concerned with only a few of their patients. Sometimes a group of specialists would make rounds and find that the intern was not available and, therefore, would leave orders or initiate therapy. Multiply this by several specialty groups, and it is easy to see that the interns were often in a state of confusion about what was happening on their floors. It was obvious that the interns must also be assigned to the special services in order to become a part of their teams. This really isolated the students on the floors, for they were completely dissociated from the house staff, their most intimate teachers. So they also were assigned to the specialty services. With everyone concerned attached to special groups, there was better coordination of patient care and teaching but more compartmentation of the surgical service. The next logical step in this process is the separation of beds and operating room facilities, which will complete the segregation of the specialties.

Table 2.—*Discharges from Surgical Services, Strong Memorial–Rochester Municipal Hospitals, 1951-1958*

Surgical Service	1951-1952	1952-1953	1953-1954	1954-1955	1955-1956	1956-1957	1957-1958	Total No.	Total %
General	2,876	2,799	2,879	2,939	3,172	3,070	2,942	20,677	41.7
Neurosurgery	339	339	377	380	385	422	451	2,693	5.4
Ear, nose, and throat	1,064	1,117	970	906	1,027	1,084	1,104	7,272	14.6
Eye	437	450	378	422	386	421	445	2,939	5.9
Plastic	317	321	302	357	375	360	417	2,449	5.0
Urology	806	835	803	816	880	810	706	5,656	11.4
Orthopedics	1,082	1,099	1,284	1,120	1,195	1,098	976	7,854	16.0

Few educators will advocate segregation and compartmentation of special areas of medical teaching. But all scientific, social, and economic trends are in the direction of specialization. The only way to resist is to ignore this, which would be out of step with the times. If specialized fields are taught, they must be taught well. To strengthen specialized teaching means appointing the best man obtainable to be in charge of the specialty, giving him associates, a budget, space, residents in training, and teaching time. If this is done, separate groups are created which splinter the field of surgery into compartments. The problem then becomes one of integrating these in patient care and teaching. This would be greatly helped if the certifying boards of the surgical specialties could agree on a period of general training in surgery which would include rotation through all specialties. Then at least all specialists would have some idea of what their colleagues were aiming at. But, in addition, experiments in coordinated medical care must be carried on in the teaching hospitals. For example, we are trying this in a "combined clinic" under the direction of the department of medicine but with all specialists available for cooperative management of the patient's problem. Such experimentation must be actively pursued if we are to find a way to avoid segregation of these many components in the face of separate interests and skills.

Regulation of Residency Training

The residency system of training was developed as a form of graduate surgical education. Halsted was intensely interested in extending the knowledge of surgery and so attracted superior graduate students. He shared with them his enthusiasm for research and improved clinical care. All the resources of the laboratory and clinic were at their disposal. After 1913, a full-time clinical staff was instituted, so there was less distraction from practice and the small attending staff was closely associated with the residents. This intellectually stimulating atmosphere developed outstanding surgeons, many of whom became eminent. The same type of environment was slow to spread. For example, in 1938, when the Society of University Surgeons was established with a condition of membership the stipulation that the candidate must have completed a university type of residency, there were 10 institutions in the founder's group. Others were soon added, but the total is now only 39 university hospitals. Yet the American College of Surgeons states, "By October 18, 1957, there were 1,520 acceptable programs in general surgery and the surgical specialties in 691 hospitals each approved by the College." This did not occur without turmoil, so it may be profitable to look at what has taken place.

The high priority given board certification by government agencies, courts, insurance companies, hospitals, and schools made it desirable. The economic and professional rewards were great so that the attainment of certification had a profound consequence on professional life. The certifying boards at first preferred and later required residency training as a prerequisite to examination. This led to a rush for residency training which could not possibly be met by the established training centers, for they were too few in number. On the other hand, the resident was reluctant to spend time in a hospital where he did not receive "credit," so "unapproved" hospitals had difficulty in filling their resident staff in spite of a large number who desired training. This led to pressure for "approval" and to the creation of residencies that did not remotely resemble the original system or, as Mulholland[4] puts it, "led to a modern mockery." The term "resident surgeon" lost its connotation.[5] This was not universal, and strenuous efforts were made to resist it by the uni-

Table 3.—*Patient Days for Surgical Services, Strong Memorial–Rochester Municipal Hospitals, 1951-1958*

Surgical Service	1951-1952	1952-1953	1953-1954	1954-1955	1955-1956	1956-1957	1957-1958	Total No.	Total %
General	32,295	30,534	30,988	29,951	34,837	32,392	31,998	222,995	43.0
Neurosurgery	3,841	4,591	4,766	4,450	4,140	4,624	5,625	32,037	6.0
Ear, nose, and throat	3,133	3,062	2,903	2,802	3,044	3,555	3,662	22,161	4.2
Eye	3,673	4,094	3,341	3,638	3,272	3,849	3,875	25,742	5.0
Plastic	3,375	3,184	2,840	3,477	3,955	4,119	4,166	25,116	5.0
Urology	9,588	9,901	8,771	8,439	8,846	8,758	6,985	61,298	11.8
Orthopedics	19,426	20,021	20,589	17,333	18,828	17,804	15,539	129,540	25.0

versity clinics and their faculty. The Conference Committee on Graduate Training in Surgery was founded in 1950 with representatives of the American Medical Association, the American College of Surgeons, and the American Board of Surgery to improve standards for residency training. The certifying boards tightened their rules and, as weaknesses developed, made more rules. Now the whole subject is hedged in by restrictive requirements,[6] all of which were honestly designed for improvement.

The original intent of residency training was the education of the surgeon. In its rapid expansion this was ignored by many, so corrective regulations were needed. This led to the basic difficulty of regulatory bodies invading the field of graduate surgical education despite the fact that they were not educational institutions. As stated previously,[6] "Residency training is not an exercise in manual dexterity, nor is it a trade school, but rather is graduate surgical education and, as such, belongs under the jurisdiction of the medical schools."

Impact of Medical Insurance

Medical insurance has had a catastrophic effect on residency training in surgery. If this appears to be too strong a statement, let us look at the facts.

The basic principle of the residency system is graded, progressive responsibility under supervision terminating with at least a year when the chief resident is largely responsible for the management and operations of the clinic patients. This is the crux of the method, for without it confidence, judgment, and technical skill are difficult to acquire. The resident in surgery can be carried far, but never finished, if only private patients are available. Yet in most university-owned teaching hospitals and in most private hospitals medical insurance has converted the clinic patients into private patients. The municipal, state, and federal hospitals have not been affected as much. Without clinic patients the basic requirement of graded responsibility for the residents cannot be met. But clinic patients do not pay the whole cost of their care, so a deficit is created. This may be paid by community or tax funds, but in a university-owned hospital it usually comes from endowment. In former years this deficit amounted to as much as $250,000 a year for the Strong Memorial Hospital, and this strained the budget in other areas of the university. Hospital insurance wiped out this deficit but in doing this cut the number of clinic patients who are so necessary for surgical teaching.

The increase in private patients in this teaching hospital has been shown[7] to correlate with the rise of Blue Cross in the community (fig. 4) and to be independent of the national income. In addition to hospital insurance by Blue Cross, there are medical indemnity insurance plans, workmen's compensation, state aid to crippled children, and some types of federal aid which add to the total effect of medical insurance. The decrease in clinic patients at the Strong Memorial Hospital is shown in figure 5, where it is seen that, in 1934, when Blue Cross began in Rochester and when semiprivate patients were admitted to the wards, the clinic patients accounted for 68% of the admissions. This dropped to 8% in 1948 in spite of resistance by the faculty, for this hospital is owned and operated for teaching. Without the 320 beds of the Rochester Municipal Hospital, which is an integral part of our medical center, we could not have maintained our standards of surgical training. Alarmed at this trend, we arranged that unassigned, unreferred patients with hospital insurance who could not pay a fee and did not want their own surgeon should be assigned to the wards as clinic patients. They were cared for by the resident surgeons under supervision. This raised the level of clinic patients to about 20% of the admissions in 1950. But in this same year Blue Shield was started in Rochester. This surgical insurance provided a fee for the operation which injected a new complication and caused some patients to be removed from the group with hospital insurance who were being admitted to the clinic. The rise in Blue Shield surgical insurance is shown in figure 6, where it is seen that in seven years over two-thirds of the Rochester population has obtained this insurance. This and other insurance has reduced the total clinic admissions to 12% in 1958. In addition, there are 300 clinic beds in the municipal hospital.

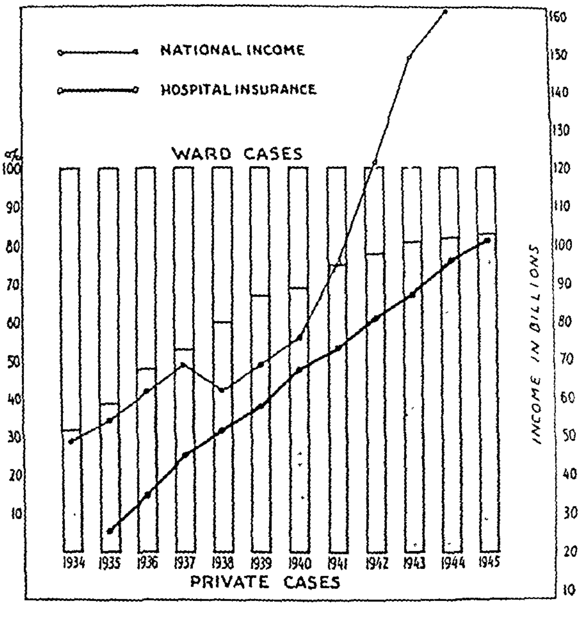

Fig. 4.—Relationship in Rochester, N. Y., area of increase in number of private patients to growth of hospital insurance and not to national income.[7]

What can we do? On the one hand the certifying boards have stipulated residency training as a prerequisite which has enlarged the resident staff, while on the other hand hospital and surgical insurance has so depleted the wards of teaching and private hospitals that they no longer have an adequate number of clinic patients to train residents. It is a good thing we have a municipal hospital and an affiliation with a veterans' hospital. But this is only a reprieve. Medical educators and the surgical profession must face up to the fact that the great benefits of medical insurance, to them and to the public, cannot be permitted to wreck training for proficiency. We cannot afford to have a generation of poorly trained surgeons.

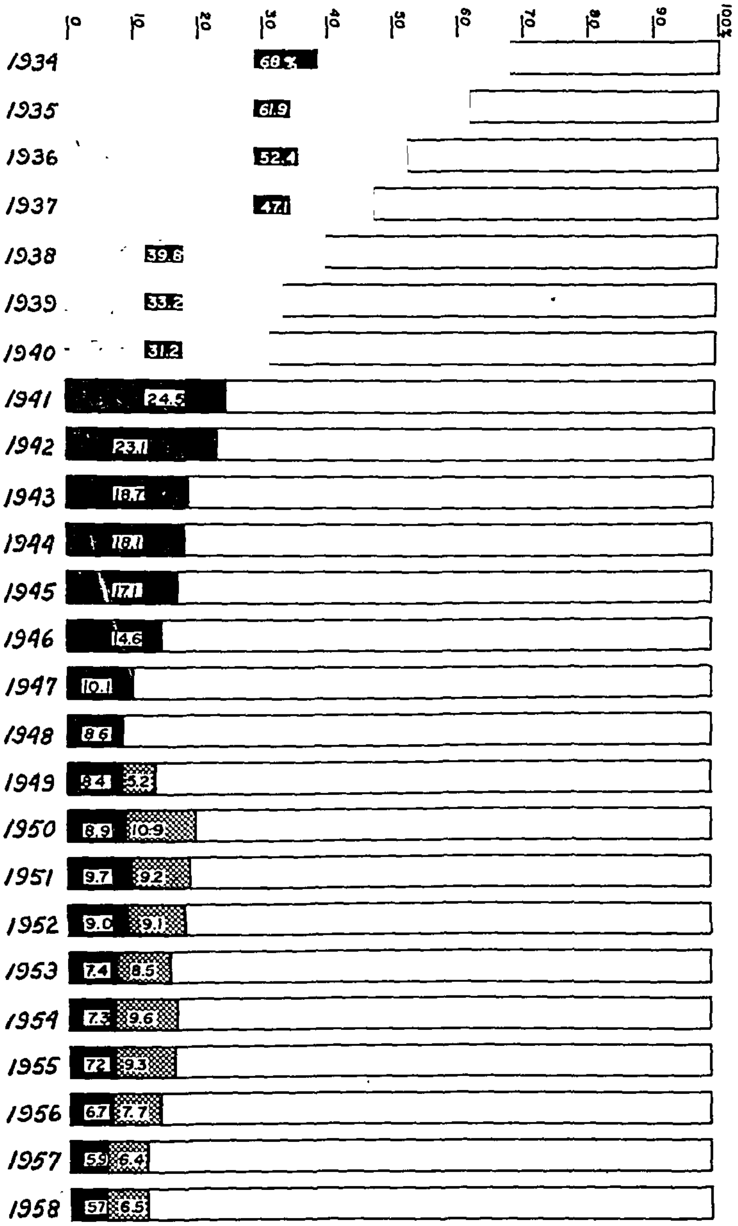

Fig. 5.—Decrease in number of clinic patients, Strong Memorial Hospital, Rochester, N. Y., 1934-1958 (black part of column=ward patients, crosshatching=semiprivate and unreferred patients with hospital insurance, and white=private and semiprivate patients).

Various expedients have been tried in order to combat this critical situation. Some medical centers have instituted group practice: the entire staff, senior and junior, are full-time, salaried, and practicing together as a group. This allows delegation of responsibility for care on the basis of medical need rather than financial standing. When the control of this is vested in the institution, some members of the staff complain that they are exploited. When the control resides in the surgical staff, where it belongs, it has been satisfactory. But to change an already existing arrangement of individual practice by a large full-time and part-time staff to one by a small, full-time, salaried group is complex and difficult—so much so that it is hard to visualize how it could be a universal answer. Another suggestion is to appoint the senior members of the resident staff to a position of junior attending surgeons who are licensed to practice and are approved for the care of insurance cases. This involves an exercise in semantics with the certifying boards, the insurance companies, and the public. The commonest expedient, at present, is to allow the resident to assume more responsibility in the operations on private patients. If this is carried to the point of lack of supervision by the responsible surgeon then it is dishonest, for the resident becomes a "shadow surgeon." Worse, it sets an example for a man, at an impressionable age, to ignore legal and ethical responsibility in order to attain a justifiable goal. Such a haphazard arrangement cannot be the permanent basis for a training program.

The straightforward approach is to have the residents licensed to practice and approved for the care of insurance patients. But when a fee is involved it becomes a bone of contention. This has blocked efforts to use insurance cases for residency training. In my opinion, these fees should be accredited to the surgical staff who have the ultimate responsibility for the care of all of the surgical patients. This staff should act as trustees of any such funds to decide on their disbursements. An unassigned, unreferred patient with surgical insurance who comes to a hospital is assigned to some member of the surgical staff who collects the fee. It follows that these fees are now the property of the members of the surgical staff and should remain so. If these patients were assigned to the resident staff who did the work it would be selfish not to allocate a part or all of the funds to improve the educational and economic conditions of the residents. We felt that a special fund should be created by the surgical staff to be used for the benefit of the residents.

In 1952, this arrangement was started and a request was made to authorize the resident to care for patients with Blue Shield and workmen's compensation. When representatives of the county medical society heard of this they objected, for, they said, it would mean that the hospital was practicing medicine. It did no good to point out that the hospital had nothing to do with it and that control was vested in the surgical staff. The request was disallowed on the basis that it would lead to "socialized medicine."

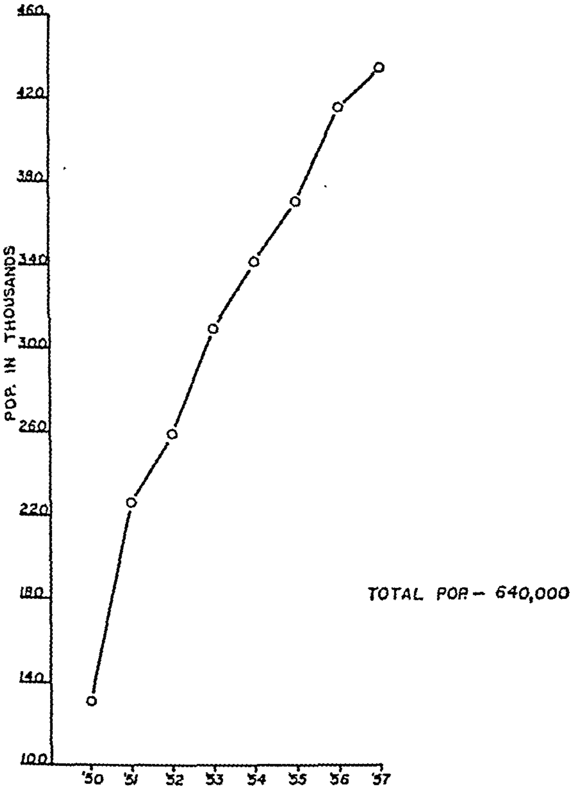

Fig. 6.—Blue Shield surgical membership in Rochester, N. Y., area, 1950-1957.

In New York state the corporate practice of medicine is illegal. This is a wise provision, for no one wants lay control of professional practice. But the medical society of the state of New York has gone beyond this by indicating that not only no hospital or institution but also no resident or intern shall have charge of Blue Shield patients. Now we must sign an affidavit on each Blue Shield form which reads: "I certify that I am not an intern or resident and that this is a true and correct statement for services which were personally rendered by me as attending physician."

This attitude completely ignores the need for training skilled surgeons. In an effort to prevent institutional practice, education has been handicapped. Unless something is done the public will suffer, for they will become the unsuspecting subjects of inadequately trained surgeons. We must exert all of our efforts to prevent this. Some way, somehow, we must find a way to retain the benefits of both medical insurance and the residency system of training. This is the challenge.

260 Crittenden Blvd.

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IATROGENIC DISEASES.—The term "iatrogenic" is a neologism which has apparently come to stay. It has been attributed to the late Sir Arthur Hurst who originally applied it to disorders induced in the patient by autosuggestion based on the physician's examination, manner or discussion. Its meaning has been extended to include any untoward incident resulting from medical or surgical treatment. . . . In spite of the great advances of medical science each new procedure or new drug seems to carry with it potential dangers. It therefore behooves every medical practitioner constantly to be on the alert for unexpected mishaps. Some may be due to lack of skill, some to lack of knowledge whilst others appear to be unavoidable. It is therefore important to be acquainted with the possible risks of each new or unfamiliar drug or procedure and to have at hand the means to counteract any emergencies which may arise. If risks can be anticipated it may be wise, in view of possible medico-legal repercussions, to warn the patient in advance. On the other hand, it is equally unwise to strike terror into the heart of a patient when risks are minimal.—W. G. Sears, M.D., Iatrogenic Emergencies, *The Practitioner,* April, 1959.

MAINTENANCE OF STANDARDS IN GRADUATE MEDICAL EDUCATION

Edward L. Turner, M.D., Chicago

Shortly before the middle of the 19th century, leaders in medicine evidenced increasing concern over the low standards of medical education and practice in the United States. During meetings of the New York State Medical Society[1] in 1844 and 1845, several resolutions dealing with medical education and licensure were introduced. Lively discussions followed; it was obvious that something should be done, but it was equally apparent that it would be impractical for one state alone to try to raise standards. It was subsequently suggested that this obstacle to improving standards might be obviated at a national medical convention, where the delegates from medical societies, medical colleges, and institutions of the several states might be persuaded to act in cooperation on this important matter. Therefore, the following resolution was introduced:

> WHEREAS, it is believed that a National Convention would be conducive to the elevation of the standard of medical education in the United States; and
>
> WHEREAS, there is no mode of accomplishing so desirable an object without concert of action on the part of the medical colleges, societies and institutions of all the states, therefore, be it
>
> *Resolved*, that the New York State Medical Society earnestly recommends a National Convention of delegates from medical societies and colleges of the whole union to convene in the City of New York, on the first Tuesday in May, in the year 1846, for the purpose of adopting some concerted action on the subject set forth in the preamble.
>
> *Resolved*, that a committee of three be appointed to carry the foregoing resolution into effect.

Although many expressed doubts regarding the possibility of such a venture, some considering it impractical or even "Utopian," the majority of the delegates were impressed with the importance of the objectives and the resolution was adopted. The National Medical Convention met in New York on the appointed day in May, 1846, and reconvened on May 5, 1847, in the Academy of National Sciences in Philadelphia. At that meeting the delegates heard the reports of the committees appointed at the New York meeting, one of which resulted in naming the organization the American Medical Association. It is a matter of more than passing interest to point out that 250 delegates attended this meeting, representing 28 states, 40 medical societies, and 28 medical colleges.

At this meeting resolutions were also adopted recommending certain standards of preliminary education for those who planned to study medicine. These resolutions, however, were adopted only after overcoming considerable opposition, such as is still encountered whenever elevation of standards is discussed. For instance, some members of the convention felt that the recommended standards would prevent from entering the medical profession persons of limited means "whose natural endowments would carry them to the highest rank, notwithstanding their inadequate preliminary preparation." The records indicate that during this argument one of the leading proponents for adoption of the standards stated, "Young men who had not mental energy and perseverance enough to comply with the standard proposed in the resolution, certainly had not enough to enable them to do justice to a profession as extensive, intricate and arduous as ours."

Development of Standards

The philosophy underlying efforts to cooperatively develop sound standards in medical education over a century ago was based on dissatisfaction with existing conditions. Leaders in the profession at that time recognized that the status of medical education was not in keeping with the knowledge and needs of the period. They were aware of the fact that many persons were being graduated into the ranks of the profession without possession of the background education and training essential and available at that period and that this was not in the best interests of the patients. The objectives of those concerned with the concerted effort that gave birth to the American Medical Association were, therefore, to make it possible to develop standards which would improve medical education to what it should have been in the setting of that period.

The concept of standards applicable to the education of the physician reaches far back into antiquity. Such standards are clearly implied in that portion of the Oath of Hippocrates[2] dealing with the physician's responsibility for teaching those seeking to enter the profession. Frederick II,[3] in the law which he promulgated in 1240 A. D. for the regulation of the practice of medicine in the Two Sicilies, under the jurisdiction of the School of Salerno, recognized that the physician must be an educated man. Standards of requirements for admission to the study of medicine were included along with those developed for both medical education and the privilege to practice. In fact, from many standpoints these high qualifications were of such a nature that only the most recent medical legislation has caught up with some of them.

It must be pointed out that the term standard has numerous connotations, which vary with the context. At least two of the possible interpretations are of importance in their application to the area of our concern during this Congress.

Director, Division of Scientific Activities, American Medical Association.

Read before the 55th Annual Congress on Medical Education and Licensure, Chicago, Feb. 8, 1959.

A standard may be interpreted, according to Webster,[4] as "something established for use as a rule or basis of comparison in measuring or judging capacity, quantity, content, extent, value or quality." When used in this manner, the concept of standard implies a more or less permanently fixed idea, such as an inch, a meter, a pound, a kilogram, or even the exact pattern of the practice of medicine in the "good old days." This utilization of the term conveys the concept of something which, once established, constitutes a permanent, fixed reference point. Such a concept of standard applied to education or training in medicine, or in any other field, becomes a hurdle to progress. It is, however, the interpretation of many of those living in the past and oblivious to or not in sympathy with the problems of today or the challenges that lie ahead.

A standard also, according to Webster, constitutes "something used by general agreement to determine whether or not a thing is as it should be," as a type, a model, or an example established by usage or a level or grade of excellence or attainment which is regarded as a goal or measure of adequacy.

Thus, we are confronted with two different concepts of the philosophy underlying standards: One deals with the establishment of clear-cut reference points to which everything must be adapted or standardized, and the other presents the concept of challenge to maintain a grade of excellence and attainment as a goal or measure of adequacy. This latter concept does not convey the idea of something fixed or unchanging but, rather, implies adaptation to change as a fundamental factor in the maintenance of standards. In other words, there is a vast difference between the concept of standards as applicable to a field, such as medical education and practice, and that of standardization, which in these days may rapidly relegate the concept of a fixed standard to obsolescence.

Hazards in Maintenance of Dynamic Standards

Efforts to develop concepts of dynamic standards in any field of education in today's rapidly changing setting are fraught with certain hazards. This is well illustrated by an incident which took place as long ago as April 4, 1909, when the Council on Medical Education voted to recommend a 4,100-hour program as "a working schedule for the medical curriculum."[5] The Council had consulted with over 100 leading medical educators of the day in the course of developing this suggested guide and specifically indicated that "it was the general opinion of those present that this schedule should not be made a hard and fast requirement with which all colleges should comply, and that strict uniformity of curricula among all colleges was undesirable." Here the Council was clearly indicating its concern that standards not be construed to imply standardization.

However, at their meeting on the next day, the Council reviewed these recommendations and concern was expressed by some that certain state examining boards might adopt the curriculum suggested by the Council as a fixed standard or guide and make it obligatory for medical colleges if their graduates were to be qualified for examination. To counteract any such inflexible interpretation, the Council adopted this resolution:

> WHEREAS, the object of the Council on Medical Education in appointing a Committee on Medical Curriculum was entirely educational and suggestive, and,
>
> WHEREAS, the impression prevails among medical teachers and members of the state boards that the Council is framing a curriculum for the purpose of having it serve as a standard to which medical schools must conform or be condemned by the state authorities as not in good standing, therefore, be it:
>
> *Resolved*, that every publication of a curriculum that hereafter may be made by the Council, its members, or its officers shall state explicitly that the Council does not consider it in the interest of true progress in education that any standard curriculum whatsoever shall be uniformly adopted by all medical colleges.

This historical note on the curriculum illustrates two important points, previously implied, which are associated with the development of standards in the field of graduate medical education. The first is associated with the danger of inflexibility of interpretation and the consequent misuse of the application of standards in any given period or setting. Second, in the rapidly changing world today standards in a field such as education and training must, in addition to being subject to some flexibility of interpretation, also be subject to constant reevaluation and readjustment, if they are to represent the the currently desirable goal, grade of excellence, or measure of adequacy.

Means of Adjustment of Standards

Recent years have witnessed increasing interest on the part of medical faculties, specialty boards, organized medicine, hospital administrators, and licensing bodies in the field of graduate medical education. Except for a few outstanding situations, relatively little interest in this field of education was manifested during the first decade of this century by others than the leading clinical teachers and those young physicians seeking additional experience.

In response to an increasingly obvious need, the Council on Medical Education of the American Medical Association began about 45 years ago the annual listing of hospitals offering satisfactory internship opportunities.[6] Subsequently, in 1919, the Council took leadership in developing certain basic guides or standards which were presented as the "Essentials" or minimum requirements for internship training in hospitals seeking approval for such programs. These basic standards were developed in consultation with leading clinical teachers. They have been *subject to constant review and revision* in efforts to align them appropriately with current knowledge and trends of any given period. Since 1928 the American Medical Association has maintained a field staff to assist the Council in the evaluation of these programs in terms of the "Essentials" and to aid those concerned with this phase of medical education in developing and maintaining adequate programs.

As the trend toward specialization advanced, the American Medical Association, through its Council on Medical Education and Hospitals and in cooperation with representatives of the specialty fields and eventually the specialty boards, undertook the task of developing basic standards or "Essentials" for graduate education and training beyond the internship. These have been prepared as guides to assist those developing such programs as well as to furnish information to persons seeking such opportunities. The Council's field staff visits institutions which have applied for approval of residency training programs and at periodic intervals revisits institutions conducting programs previously approved. Reports of the findings during such visits are submitted by the field staff to the Council and specialty boards and constitute part of the evaluation process currently utilized in the approval and annual listing of programs in the field of graduate medical education.

In order to obviate unnecessary duplication of effort as well as dual concepts and interpretation of standards by the Council, which approves programs, and the specialty boards, which evaluate and certify individual physicians as meeting specialty qualifications, the Residency Review and Conference Committee[7] procedure was developed. These committees, representing both the Council and the specialty boards, have cooperatively reviewed and revised the "Essentials" in keeping with the changing scene. Furthermore, this cooperative function extends to the responsibility for approval of residency education and training programs, subsequently listed by the Council in the annual internship and residency issue of THE JOURNAL. One of the most important objectives of this liaison has been to foster opportunities in residency education and training for total programs in any given institution or through appropriate affiliations so that the resident may be assured of reasonable continuity and upgrading rather than undergo fragmented, isolated, and inadequate segments of experience.

The 1940 Report of the Commission on Graduate Medical Education[8] clearly indicated the objectives and basic principles underlying the internship, residency experience, and postgraduate education. The need for constant study and reappraisal, intelligent experimentation, and flexibility of thought and action is emphasized throughout this report, most of which, with minor modifications, is pertinent to the current setting.

Perspective in Specialization

Graduate medical education has not developed on the basis of careful study or projection of needs in specialty areas. To date, graduate medical education and training has developed in response to the interest of leaders in the various specialty areas. Clinicians as well as hospital administrators recognize the valuable service functions which accompany the educational aspects of intern and resident programs. Through the activities of the Council on Medical Education and Hospitals, the American College of Surgeons, the American College of Physicians, the specialty boards, the Association of American Medical Colleges, and other interested organizations, it has been possible to maintain some semblance of order in graduate medical education out of what might otherwise have resulted in chaos equivalent to or worse than that existing in medical schools at the turn of the century.

Today there are no absolutely clear-cut lines of division between the clinical clerkship of the final year in medical school, the internship, the residency, and even some aspects of postgraduate medical education. In many instances the same facilities and patients are being utilized and the same faculty personnel may be involved in all of these areas of medical education. Advances in knowledge have been of such magnitude that the medical school experience alone no longer qualifies a physician to enter practice but, rather, furnishes the initial plateau on which he erects the additional education and training essential to qualification for general practice or a specialty.

It is natural, in view of this rapidly changing panorama, that there has been aroused interest and concern on all sides regarding the various phases of medical education, particularly with its graduate aspect today. In the 40 years since the establishment of the standards suitable for qualification for the first of the approved American specialty boards, 18 other basic specialty boards have been approved. In addition, there are 6 areas of certification in subspecialties and 28 areas of special certification for a total of 53 different sets of standards and qualifications.[9] These constitute only those specialties, subspecialties, or areas of special certification which have met approval of the American Medical Association through the recommendations of the liaison mechanism established between the Council on Medical Education and Hospitals and the Advisory Board for Medical Specialties.

The rapidly changing advances in therapy since the establishment of the 19 approved boards in the medical specialties have necessitated major alterations of requirements and standards for some of them in order to justify their continuance as identifiable entities. Natural history[10] furnishes many examples of the situation in which, as time goes on, the very qualities which initially insure success and constitute "fitness" may eventually prove a handicap to specialization. Where an area of interest is too narrowly specialized to a given set of conditions, the specialty has the potentiality of succumbing if the conditions justifying its original development disappear or become markedly altered. The warnings of natural history are worthy of serious thought today as the trends for narrow specialization continue, for, in the long run, excessive specialization or overrigidity in the application of standards may become distinctly disadvantageous and result not in survival but in extinction or stagnation.

In the course of this review, I have endeavored to portray first the early background efforts of the medical profession in the United States to develop standards for professional education. This early concern stemmed from the desire of medical leaders to make it necessary for persons entering the field of medicine to do so through having opportunities for education and training in keeping with the knowledge and needs of any given period and in the best interests of their future patients. It was apparent from the beginning of this effort that the development and maintenance of sound standards necessitates cooperative effort and cannot be achieved by a single state or organization. The philosophy underlying these early efforts to develop standards in medical education was based on dissatisfaction with existing situations and a desire to elevate the education of the profession to what it should be.

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WORKSHOP CONFERENCE ON SPECIALISM IN MEDICINE

I. RESIDENCY PROGRAM

Wright Adams, M.D., Chicago
and
George A. Wolf Jr., M.D., Burlington, Vt.

The Workshop Conference group on Specialism in Medicine concerned with the residency program started with a kind of explosive force. The intense interest in the subject stemmed from the fact that the number of residency positions available rose from 7,666 in 1945 to 27,835 in 1956[1] and that four new American specialty boards were created in the same period of time.

To summarize the "talk" which occurred would consume much space, and to identify the emotions which darted about would require uncommon qualities in a scribe. In the first place, the panel was composed of experts; all members, as in local Parent-Teacher Associations, had been through the mill and knew all about it. The true experts (the young residents) spoke with a voice of good sense but, unfortunately, had not experienced the "good old days" and were thus automatically disqualified. It was agreed, however, that residents are underpaid, and note was made of the fact that some had to work out of hours for pay to support wife and family. Many residents, although presumably being educated, do not have time to read during their course of instruction. Finally, in some instances, the resident seemed to be more of a hospital employee than a true arm of the chief of service.

The ills of the residency program were blamed indiscriminately on the specialty boards, the American Medical Association, the Council on Medical

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Professor and Chairman, Department of Medicine, University of Chicago School of Medicine (Dr. Adams), and Dean, University of Vermont College of Medicine (Dr. Wolf).

Read before the 55th Annual Congress on Medical Education and Licensure, Chicago, Feb. 9, 1959.

Education and Hospitals, the Advisory Board for Medical Specialties, the Joint Accreditation Commission, and the university teachers.

It was illuminating to realize that the American Medical Association, through the Council on Medical Education and Hospitals and the Advisory Board for Medical Specialties, merely determines certain *minimum* standards for the establishment and recognition of specific specialty boards. The boards determine their own programs of training and give examinations. The Council on Medical Education and Hospitals inspects residencies to see if the rules laid down by the specialty boards are followed. The Joint Accreditation Commission concerns itself with the hospital as a service and not as a training institution. The university hospitals are inspected by both groups and do not set minimum standards, although we hope they might point to maximum ones.

We then pursued the objectives of a residency training program. In brief, everybody was against sin, and for a while it appeared as though research as part of a residency program was a sin. Research was variously defined all the way from that conducted by the bearded savant who frightened patients in his musty basement laboratory to that of the tippling dilettante whose scientific curiosity begins and ends with asking the question, "Where am I?"

Cooler heads prevailed, and it was finally conceded that few of us (residents included) are true academic career investigators but that many of us approach a clinical problem with a base of scientific information, accumulate data by careful observation, synthesize the data into a working diagnosis, and plan and execute controlled therapy.

We neglected to explore the educational process from the standpoint of the truism that teaching and research go hand in hand and that the teacher who is not constantly testing his knowledge, questioning its validity, and adding to his fund of proved information is not a teacher but, as one bright student said, "a person who is transmitting static ignorance from one generation to another."

There was no doubt that we all wanted to train a good physician, but at that point, as usual, we were unable to define a good physician. "Honest" and "qualified practice in the area of his interest and training" were mentioned. This was good until somebody said "private practice," and the fight was on. Almost in tears, one of our members predicted the demise of solo private practice, and the academicians immediately jumped to the conclusion that training for private practice was directed against academic medicine.

Eventually, it became clear that we all should encourage young people to go into academic medicine because of the shortage of teachers. It was agreed that undergraduate medical schools should not be loaded with too much specialty training and that the education during the undergraduate years should be basic. Nobody defined basic, however. Training in university teaching hospitals should provide opportunities for those interested in academic medicine as well as the practice of medicine in whatever form. Nonuniversity teaching hospitals have a job to do in preparing physicians for the practice of medicine but need not discourage interested residents from entering academic medicine.

The quality of the teacher came up for the usual discussion. Here, the all-or-none law prevailed—investigators were poor teachers, practitioners were poor teachers, and so forth. In stereophonic, however, it sounded as though the good teacher was a person with time to teach, with interest in teaching, and with adequate curiosity and energy to educate himself continually. He had the ability of delegating to residents the care of patients under supervision according to the stage of development of the individual resident. It was emphasized that medical student teaching by residents assists in the learning process of the latter. It was abundantly clear that the best residency program, according to the book,' and the best teaching hospital are no better than the teacher involved. A good teacher could guide a resident into doing some original investigative work, and this experience in itself was felt to be of some value to the training of the resident as a practitioner.

Residency training programs which are rigid and prevent the development of originality in a resident were scored. Rigidity and narrow experience might lead to the training of supertechnicians in certain fields, but general training as a physician was felt to be necessary. The point was made that a specialist in a restricted field must either have some general training enabling him to give full care to patients or else limit himself to consulting practice. Here it was not clear whether the basic training needed prior to the residency program was to improve the understanding of people and human pathophysiology or to prepare the specialist to take care of most of the diseases he would find in certain specific practice circumstances.

The spirited discussion raised several questions which need answers: What is basic to the education of all physicians prior to entering upon specialty training? Should this vary in the case of certain limited specialties? Can specialty boards establish minimum standards without imposing rigidity of program and preventing development of originality in the resident? Are there too many specialty and subspecialty boards? Can university medical education and hospital training for general or specialty practice be defined more clearly?

Miss Theresa E. Falaguerra, assistant project director, Bureau of Applied Research, Columbia University, assisted in preparation of this report.

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WORKSHOP CONFERENCE ON SPECIALISM IN MEDICINE

2. THE SPECIALTY BOARD

John M. Mitchell, M.D., Philadelphia
and
Sam W. Banks, M.D., Chicago

The Workshop Conference on Specialism in Medicine from the standpoint of the specialty board was opened at 2:15 p. m. with a large attendance. The nature of the facilities precluded a satisfactory round-robin talk by the members of the workshop panel, and the chairman invited all guests to participate. There was a lively discussion from the floor throughout the proceedings.

As an introduction, the purposes and functions of a specialty board as described in the "Essentials" were elaborated on as follows: (1) to assist in improving the quality of graduate education in that field; (2) to establish minimum educational and training standards in the specialty in conformity with the general provisions of these "Essentials"; (3) to determine whether candidates have received adequate preparation as defined by the board; (4) to provide comprehensive examinations to determine the ability and fitness of such candidates; and (5) to certify the competence of those physicians who have satisfied the requirements of the board as a protection to the public and the profession.

After this, the history of the development of specialty boards was outlined. It was brought out that, in the early days of specialization in the United States, there was no mechanism by which a person might be identified as a specialist. Many men entered the field of specialization from general practice after having gradually developed their work in a single area. Other physicians entered specialty practice through residency training, but the residency training programs in those days were determined entirely by the chief of service and the facilities at his disposal. The duration of training was, in its turn, determined by the chief or by the whims of physicians undertaking training. Other physicians entered specialty practice through preceptorships, while still others, after a vacation period of indefinite length abroad in which they might or might not have really participated in training programs in one or another of the European capitals, returned and declared themselves as specialists. It was to meet this highly unsatisfactory situation that the first specialty boards came into being.

The belief was expressed that medical schools at this time were in no position in terms either of personnel or of finances to undertake the regulation of specialty training and the boards filled this gap. The belief that medical schools were not in a position to do this was not held by everyone, the opposing opinion essentially being that there was a lack of appreciation on the part of schools of what was happening.

The Training Program

The rapid growth of specialization and of residency training programs was indicated by the fact that at their inception in the first decade of the present century 2,000 residency appointments were in existence throughout the United States while today there are 25,000 physicians in residency training.

Some expressed the view that the boards should not enter in any way into the conduct of residency training programs and that they should not have requirements for a specified period of training prior to certification. It was postulated that the board's only function was to certify to the competence of the person to practice the specialty. The mechanism by which this competence was attained should not essentially be the concern of the board; it should depend entirely on an evaluation process to determine who should receive its certificate.

It was brought out, however, that no one could say with authority that any particular plan of training was necessarily the best or only acceptable plan and that every person required the same sort of training. The procedure thus outlined follows fairly closely the English system, in which full dependence is placed on the examination.

In rebuttal, it was noted that some 75% of candidates in Great Britain flunked the first examination because their training had been unsuitable, whereas in the United Sates, where training programs are prescribed, the failure rate is not nearly so great. Further, it was noted that although specialty boards set minimum standards many allow for flexibility within the stated program through one or another device. Further, in support of the system in the United States, it was brought out that many hospitals with relatively weak training programs had sought assistance of the boards and, with this aid,

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Dean, University of Pennsylvania School of Medicine (Dr. Mitchell), and Secretary-Treasurer, American Board of Orthopaedic Surgery (Dr. Banks).

Read before the 55th Annual Congress on Medical Education and Licensure, Chicago, Feb. 9, 1959.

had been able to improve their training, resulting in raising the level of residency training and of specialty practice.

The Examination to Determine Competence

The question was raised as to whether we can depend on an examination as the sole means of determining the competence for specialty practice. It was the general consensus that this could not be depended on and that consideration must be given to other factors, namely, the site of training, the duration of training, and the evaluation of the trainee by chief of service.

It was emphatically brought out that the board can only certify that the candidate has fulfilled the training requirements, that he has been recommended by his peers, and that he has passed the examination of the board. There seemed to be general agreement that this was as far as the board could go, and it was reiterated emphatically that the boards did not consider themselves to be licensing bodies but that the certificate was more in the nature of a degree—that is, it indicated a certain background of experience and the ability of the person to pass the examination at a given time.

Uses of the Certificate

It has not been the intent of the boards that the certificate be used to limit staff appointments to those who hold certificates, to give grounds for preferential treatment in terms of compensation for diplomates of boards on certain government services and hospitals, or to indicate that those who do not hold certificates are not competent and that they should be necessarily limited in their freedom to practice a specialty. However, it was brought out that other agencies than the boards themselves did use the certificate as a criterion for their own purposes and that this should be admitted. Several persons saw no objection to this. In any event, all agreed that there was nothing the boards could do about it.

What does specialty board certification mean to the profession and the public? This question was raised, but no one seemed to feel qualified to speak for the meaning of certification to the public. It was felt that its meaning to the profession had been covered in other discussions and needed no further clarification.

Residency Training in Approved Centers

No clear-cut statement with regard to a satisfactory substitute for board regulation of residency training programs was brought forward. It was suggested that a searching examination might be used for this purpose. The belief was stated by one member that this was possible in certain specialties, such as pathology. Nobody, however, was able to bring forth a satisfactory alternative plan, and, while the desirability of flexibility was expressed by many, in practical application it was felt that some evaluation and regulation of training programs was necessary, at this stage in our development, with many hospitals lying entirely outside regularly constituted teaching centers. Many of these hospitals conduct highly satisfactory training programs, but a high percentage need guidance and assistance and many turn to the boards for this help.

Questions were asked on the number of specialists to be trained and the anticipated needs for the future. No answer was forthcoming, but it was indicated that a balance between supply and demand was maintained by the mechanism whereby unoccupied residencies were dropped and, when new programs were created and not occupied, that they also were inactivated.

NEW OCCUPATIONAL DISEASES.—Every year some 200 disease entities are added to the total number of approximately 3,000 occupational diseases. This increment is more than the aggregate for all other medical specialties combined. It may be doubted that any professional distinction resides in this continually mounting lot of added affections, but the fact reveals the tempo of industrial medicine and the requirement for swift adjustment in meeting increased professional burdens. The majority of the additions represents precisely new entities springing from the appearance of a new chemical compound every 24 minutes throughout the year. Many of these chemicals never become important to production. Of those that do, the majority prove innocuous as to toxic properties. There remain those highly significant ones that possess harmful properties for sufficiently exposed workmen.

A second source of the yearly increase in occupational diseases is the fact that many pathological states, long regarded only as diseases common to ordinary life, under special circumstances become true occupational diseases. . . . An example is psittacosis. In the early days this disease was regarded foremost as a threat to the owners of pet psittacine birds. Soon it became apparent that dealers readily might be involved. Still no label of occupational disease was applied. Only in recent years has the proper category appeared after the high incidence of psittacosis in the fowl packing industry brought about the full acceptance of this disease as inescapably occupational under some circumstances.—Carey P. McCord, M.D., The Zooanthroponoses, *Industrial Medicine & Surgery*, April, 1959.

WORKSHOP CONFERENCE ON SPECIALISM IN MEDICINE

3. THE RESIDENT AND FELLOW

A. McGehee Harvey, M.D., Baltimore
and
George G. Reader, M.D., New York

The workshop was opened with an outline of the magnitude of the problem posed by the training of residents and fellows. The figures given by Dr. Ernest L. Stebbins were cited: 31,000 physicians studying in 5,000 programs in 1,200 different institutions. This is a far larger area of educational endeavor in medicine than the medical schools themselves provide. With the growth in population and research training predicted by the Bayne-Jones report, it may be expected that by 1970 a billion dollars a year will go into medical education and research. Since less than a third of that amount is now being spent, the rate of growth in the next decade will be logarithmic. It is going to take a great deal of intelligent thought to plan the new training programs and to deal with the competition that will inevitably occur among them.

Various members of the panel were then called on to discuss the problem from their respective points of view. Dr. Robert Glaser spoke as a medical school dean, drawing attention to the dilemma posed by the educational needs and service responsibilities of residents. He emphasized the need to keep residency and fellowship programs education-centered and pointed out that it is far too easy in residency programs for the house officer to become involved in service. If he does, he may develop his technical skills but there is the danger that he will not learn to continue his education in the broadest sense. All of us in medical education are concerned with three functions: education, research, and service. It takes an active effort to see that an appropriate balance between these is maintained for the resident or fellow. In this important phase of his education, service and even research activities must be controlled.

Hospital Problems

Dr. Russell Nelson, a university hospital administrator, referred to Dr. Herman E. Pearse's report on surgical training at Strong Memorial Hospital, Rochester, N. Y., for evidence that the service component of residency training is diminishing in university hospitals. He voiced some concern that the service load continues to be a serious problem in nonuniversity hospitals which have the majority of residency programs. In some of the smaller hospitals, it may actually be easier to build up residency programs to meet service needs than it is to attract interns.

Another problem for the hospital is meeting the resident's economic needs. In most instances his stipend comes out of the hospital's operating income and his economic requirements, therefore, compete with other powerful factors—inflation generally and the increasing complexity of the modern hospital —which are steadily forcing hospital costs upward. But young men and women in residencies should be looked on as graduate students, and their economic needs should be met from that point of view rather than from the point of view of their contributions to hospital service.

Dr. Henry Uhl spoke as director of medical education in a hospital not affiliated with a university. He raised a number of questions germane to this situation. One is the problem of organizing a group of practicing physicians into an effective teaching faculty. He pointed to the long-standing precedent of the full-time pathologist in the hospital serving as the mainstay of any teaching program. Full-time radiologists, anesthesiologists, and clinical department heads may be expected in the future also to form a nucleus for the teaching faculty required in a residency program.

Another problem in the nonuniversity hospital may be the characteristics of the residents themselves. Often these men have less academic ability than their classmates who have obtained appointments in university hospitals. They may therefore require greater efforts to motivate them to learn because their inclination is to occupy themselves merely with technical busy-work. Foreign graduates, too, are absorbed mainly by the nonuniversity hospitals. Their academic preparation in medicine is often less good than that of American graduates, and they may be oriented more to vocational than to educational goals.

The number of candidates who desire residencies may always be expected to exceed greatly the capacity of university hospitals to accommodate them. It is important, therefore, that nonuniversity hospitals achieve an educational atmosphere and continue to raise their standards.

Needs of Medical Trainees

Dr. John S. DeTar, of the American Academy of General Practice, then raised a question regarding the needs of medical trainees in the light of their ultimate role as practitioners. He pointed out that between 40 and 50% of the men graduating from American medical schools between 1940 and 1954 are now in general practice and that this percentage is rising rather than declining. Of those entering general practice since 1940, only 62%

Professor of Medicine and Director of the Department of Medicine, Johns Hopkins University School of Medicine (Dr. Harvey), and Professor of Medicine, Cornell University Medical College (Dr. Reader).

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have had any residency training at all.[1] Most medical educators agree that a one-year rotating internship is inadequate preparation for practice. Two years is a minimum, and this experience should be especially designed for the man who will be a family practitioner. But, of the 25,000 filled residencies in the United States today, only 468 are in general practice and most of these are inadequate.

The American Medical Association's Committee on General Practice has been working on this problem for the past two years. This committee includes representatives from the Association of American Medical Colleges, the specialty boards, the A. M. A. Council on Medical Education and Hospitals, and the American Academy of General Practice.

Dr. DeTar stated that their present plan is to recommend a two-year program that would replace the internship and one year of residency training. It would consist of 18 months of adult and pediatric medicine and would include dermatology, office otolaryngology, and traumatic and minor surgery. The final six months would be spent in surgery, obstetrics, or a subspecialty of medicine, depending on the type of practice the physician anticipates. The Committee has defined a general practitioner as a doctor of medicine who assumes total continuing responsibility for the health of the individual and his family, and it is believed that the program outlined will serve as a proper basis of preparation for this role. It is expected that further training would be obtained, possibly with specialist preceptors on the hospital staff in the community where the young physician enters practice. Dr. DeTar commented that the Committee hoped the state boards of licensure would acknowledge the value of the program outlined by requiring it in place of the present one-year rotating internship.

Dr. Patricia Kendall, a sociologist on the staff of Columbia University's Bureau of Applied Social Research, then reported some findings from ongoing studies of the attitudes that medical students have toward their professional role.[2] Data are available from students of three schools over a number of years. These students are now being followed through internship and residency training.

The quality of teaching was by far the most important consideration that led them to choose a particular hospital for their internship. Salary ranked very low in their stated considerations, and it seems to be a factor only for persons who, because of family obligations, are under great financial pressure.

The degree of responsibility they expect to have is highly important to them, as are the medical reputation of the hospital and adequacy of patient material. They are wary of being exploited and of being required to do any considerable amount of scut work.

It is becoming evident from their responses that they look on their internships and residencies as progressive educational experiences. What may contribute to learning at one stage, therefore, may later be considered repetitious and trivial. In view of this, it may not be realistic to speak of service and education as a dichotomous dilemma. It may be more appropriate to determine the cut-off point at which certain activities cease to be educational for the resident.

Other Problems

After this, discussion among members of the panel became general. In this discussion and in questions raised from the floor, a number of topics were reviewed. Both residents on the panel, Dr. Albert Fish and Dr. Nahman Greenberg, emphasized the importance of the economic situation of the resident. They pointed out that, although salary was not usually the major inducement for choosing a particular residency, lack of adequate funds often requires the resident to make compromises in his career plans. These compromises frequently limit his potential development.

Others suggested the possibility that the financial advantages of fellowship stipends sometimes caused young physicians to accept fellowships for research training prematurely. By interruption of their residency training, their proper clinical development as physicians may have been handicapped or retarded.

The question of how to compensate for the decline in ward patients was also considered. Whether private patients can be used in residency training is a moot problem. Many felt that the difficulties are more likely to arise with the patient's physician than with the patient himself. If the private physician is sympathetic to the resident's needs, his patient is usually agreeable to being transferred temporarily to the care of the resident. The private physician then acts as preceptor and consultant. This, of course, is more difficult in surgery than elsewhere.

Finally, it was felt that the training of practicing physicians as teachers merits special attention. Hospitals must be so organized as to provide a framework within which the practicing physician can function as a teacher. For these purposes, it is essential to have supervisory relationships, such as those offered by a full-time chief, that serve to instruct the practitioner in his educational role.

525 E. 68th St. (21) (Dr. Reader).

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WORKSHOP CONFERENCE ON SPECIALISM IN MEDICINE

4. THE HOSPITAL

Joseph C. Hinsey, Ph.D., New York
and
John F. Conlin, M.D., Boston

"What are the objectives of the hospital administration and the medical staff in establishing or maintaining graduate clinical training programs?"

It was felt that, in essence, graduate clinical training programs were an upward extension of medical education from the medical schools into the hospitals. About one-third of all internships and less than half the total number of residencies offered are located in hospitals making available outstanding educational experiences. Despite continued and concentrated effort, many hospital administrators, trustees, and hospital staff members have continued to place emphasis on the "service" aspects of house staff training.

It is admittedly difficult to render a precise definition of service. However, it was strongly felt that overemphasis of "service to institutions" or "service to staff" with considerably less emphasis on the basic requirement of furnishing an educational experience to the house staff members is undesirable. It was brought out that in many instances a busy service experience can be accompanied by a drive to read and to study and benefit by teaching and consultation opportunities, thus keeping abreast of the rapidly paced service march. Hospital administrators and hospital staffs usually aim at common ends but differ occasionally concerning the methods of obtaining them.

There was considerable discussion of unsatisfactory situations arising from overlapping areas of specialty jurisdictions. It is impossible, administratively, to follow rigid policies of area segregation of various subspecialty patients in general hospitals. There was strong support for administrative grouping of the surgical specialties, including obstetrics and gynecology, and of the medical specialties, including pediatrics.

There was, likewise, strong feeling that many present administrative problems of the hospitals arise from the rather haphazard growth and development of the many specialty and subspecialty boards. A parallel was drawn between widespread efforts to integrate undergraduate medical curriculums and the need to reevaluate and regroup supervision of services and training in the various specialties. The evils of overdepartmentalization, splintering, and fragmentation were repeatedly stressed. The chairman pointed out that two aspects of immortality were represented by the "bureau" in Washington and the "department" in a medical school or hospital.

There was complete agreement that the primary objective in establishing and maintaining graduate clinical training programs is the best service to the public and the best possible care of the patient. Size of the hospital and extent of its teaching program should result in no departure from this basic statement of objective. It was also pointed out that the different problems of teaching hospitals regarding the teaching of undergraduate medical students, interns, and residents, in any combination of these, will have an effect on graduate clinical training programs.

The objectives of graduate clinical training programs will be affected in varying degree by trends in medical care programs, various types of insurance programs, availability of private patients for teaching, and other factors. It was agreed that good teaching programs should not depend entirely on the availability of ward or service patients.

The hospital administration and the medical staff have a major objective in setting the highest possible level of performance of their teaching function, and from this should follow high-level patient care. There was general agreement that research and teaching are inseparable and that it almost invariably follows that where these are of a high level patient care of good quality should result.

One of the hospital's primary purposes is the attracting and holding of an able staff. There seems little question that the establishment and maintenance of a high type of graduate clinical training program is a means of attaining this end.

Compatibility of Objectives and Responsibilities

Question two was as follows: "Are these objectives always compatible with the medical service responsibilities of the hospital and the educational goals of the residents? If there are conflicts, what are their sources?"

This problem was posed in general terms as one of the areas of conflict between service responsibilities of hospitals and the responsibilities for furnishing proper training programs. Considerable discussion hinged around outpatient department services. It was admitted that these services could

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Director, New York Hospital–Cornell Medical Center (Dr. Hinsey), and Medical Director, Boston City Hospital (Dr. Conlin).

Read before the 55th Annual Congress on Medical Education and Licensure, Chicago, Feb. 8, 1959.

constitute a substantial drain on the time of house staffs. It was further admitted that an outpatient department, doing a proper service job, undoubtedly lessened admissions to the hospital by stepping up diagnostic, treatment, and rehabilitational procedures at the outpatient level. A corollary to this, however, was the increase in hospital admissions due to faster case finding at diagnostic clinic levels.

Attention was given to the aspect of increased reliance on house staff members by the visiting staff in the care of private patients. This function has, of course, elements of both service and education.

After considerable discussion there appeared to be agreement that, despite the advantages of performing and even repeating many low-level technical procedures as part of the learning process, caution must be exercised to avoid wasting of valuable time through undue prolongation of the apprentice period in senseless repetition of unnecessary tasks. The experience of the military forces in the increased use of technical assistants, as for operating room technicians, was cited as an example of a trend leading toward more efficient utilization of professional personnel services.

Where unmet service needs exist, there is a tendency to seek out and use any services available. Many institutions, in the absence of high-quality graduates, have had recourse to the services of low-qualifying foreign graduates, resulting in a lowering of the level of available patient care.

With the increasing complexity of hospital services there have been increasing demands on the services of radiologists and pathologists. This has frequently been interpreted as a local need for increasing the number of residents in these fields, but, in many instances, the local need was for another pathologist or another radiologist rather than for another specialty resident. Areas of conflict have arisen from the tendency to build empires within specialties. There has been a marked increase in the tendency to develop highly specialized services within broad specialty areas.

Residents trained in many highly specialized fields have difficulty meeting the requirements of the broader general specialty needs in the communities to which they go. Various hospital departments, including a wide diversity of highly specialized services, present problems of duplication, overlapping, and costly budgeting.

It was generally felt that it was not necessary to good teaching in good graduate clinical training programs that a department should be completely self-contained with its own radiology, biochemistry, and other specialty groups.

Discussion included the variation in the needs of community hospitals and large teaching hospitals. It was agreed that what happens in the teaching hospitals definitely has an impact on the community hospital, since the latter is a consumer of the professional practitioner services produced by the former. It was strongly stressed that the overspecialized worker, such as a radiologist whose major field of interest is in radioisotopes, may not meet the requirements of a community in urgent need of a well and broadly trained radiologist.

In general, there was agreement that the service responsibility of a hospital can be satisfactorily met outside the training program and without undue interference with the training program.

Provision for Needs of the Residency Program

Question three was "What are the responsibilities of the hospital administration, the medical staff, and the patient population in providing for the needs of residency programs, in terms of (1) teaching personnel and program, (2) research space and equipment, (3) library, and (4) clinical material?" In regard to the first portion of the question, it appears that, in many instances, approving authorities for residency programs are guided by the attitudes of persons in charge of specific programs. These persons are frequently of excellent ability and may be inspired and devoted teachers. It is possible for a teaching program to succeed because of the inspiration and leadership of one person, but it should be pointed out that more than a one-man preceptorship type of training is required; for a program to succeed, interest should extend considerably beyond a single teacher. Satisfactory individual departments and individual performance levels do not necessarily combine to an effective program. There must be a coordinating factor at work.

There was general agreement that teaching programs needed planning and continuing, preferably full-time, supervision. There is a dual responsibility of the hospital administration and of the medical staff to see that standards are set and maintained.

Comments on the second portion of the question, namely, research space and equipment, pointed out that area, cost, and amount of equipment would depend, to a great extent, on the size of the institution and the size of the program conducted. It was stressed that the spirit of research can be had wherever teaching is carried on and that this spirit can grow and develop within the means available to the hospital. It was noted that many institutions are being led into expenditures for research programs where competent persons to conduct the program are not available. There is danger in the concept of "research for the sake of research." There must be available sound planning, the exercise of sound discipline, and the specialized equipment to meet the needs of an available staff and its interests within the limits of the ability of a hospital to supply it.

There was agreement that it is valuable for a resident to be exposed to a research program. He should be encouraged to conduct a modest program of his own, under proper direction. Without this experience, he will lack a proper appreciation in evaluating the results and the reports of others. There is not always time for an extensive research program for residents. It was pointed out that undergraduate medical students, through various fellowships, summertime work, and similar programs, have markedly increased opportunities in recent years for exposure to research programs. It was felt that it was certainly not necessary for all hospitals to offer extensive research opportunities.

In regard to portion three, the library, it was agreed that research begins in the library and that adequate library services should be furnished by the hospital administration for at least the routine needs of residents in training.

Relative to portion four, provision of clinical material adequate in numbers and kind, available statistics show a trend on the part of candidates for graduate training of migration toward larger hospitals and away from smaller hospitals. It was felt that, as the number of graduates increases, some existing vacancies will be filled in order to meet their needs. Progress is being made toward the objective of making available for residency training all patients—private, semiprivate, and public. There are continuing difficulties in various places in making private patients available for teaching. It is felt that the greatest progress has been made in the use of private patients for teaching by groups. There is danger in the selection of the term "use" of the private patient. Actually, the private patient benefits by participation in a teaching program.

Compatibility of Service Demands and Educational Opportunities

The discussion then moved to question number four: "Are service demands and educational opportunities for the resident staff generally compatible?" It was generally agreed that these demands and opportunities are compatible. There are, however, notable exceptions and wide variations in various parts of the United States. The tendency to lengthen periods of residency training was deplored. The remarks made previously (concerning prolonged and senseless repetition of apprentice-type tasks) were felt to have pertinence in the discussion of this topic.

Remuneration for Residents

Question five asked, "What is an equitable financial remuneration for residents? How can it be determined, and what should be its source?"

It was felt by some that pay should be made for services rendered. It was pointed out that in the past decade more residents have married and that the presence of two and three children in their households is not unusual. Lengthy training periods present serious economic problems. It was felt that responsibility for payment for residents' services could be assigned (1) to the hospital, since residents care for patients; (2) to the university, since in teaching centers residents engage in teaching students; and (3) to the patient and especially to third-party sources of payment. It is perhaps forgotten that in one way or another the cost is ultimately passed on to the patient.

The perennial problem of whether members of the healthy community or those of the sick community should underwrite the cost of residency training was discussed, but time did not permit adequate consideration. It is regrettable that prolonged borrowing to finance a lengthy educational experience in some instances leads to concentrated effort to obtain a high level of earning as rapidly as possible in order to "get it back fast."

There is no doubt that many who wish to continue residency training are unable to do so because of financial handicaps and are unable to borrow. This has always been true to some extent. In balance, it must be remembered when considering resident stipends that much is received in return for the opportunity for the resident's educational experience and that this is not immediately measurable in dollar value.

The question was raised whether compensation of residents at a high level would help or hurt. There seems to be little experience to justify opinion in this area. There was some feeling that too-high levels of payment might lead to undue prolongation of periods of resident training.

The Hospital Director of Medical Education

The discussion then moved to question six: "What is the proper role of a hospital director of medical education? What should be his relationship to the hospital administration, medical staff, house staff, and patient population?"

The position of hospital director of medical education has evolved rapidly in the past few years. This responsibile position has been of great advantage in instances in which there has not been a continuing responsibility for a resident training program. In many hospitals service chiefs rotate at frequent intervals—in some instances more than once within the same year. Such lack of continuous direction and control obviously works against satisfactory educational programs. Many of these situations have been satisfactorily resolved by obtaining services of competent, well-trained young men with special interests and abilities.

Special problems concerning this relatively new area of responsibility have been discussed at various times and, as recently as within the past month, at a meeting of hospital directors of medical education conducted under the sponsorship of the American Hospital Association. Unfortunately, lack of time prohibited additional discussion of this topic at this workshop.

Related Comments

Lest the monotone of this report imply that the discussion was gentle and even desultory, your reporter begs leave to toss in these few random direct quotes:

"The house staff renders professional services. Why shouldn't the visiting staff contribute toward payment of their salaries?"

"Certainly we residents cannot ask for all we would be worth in practice."

"Many hospitals feel that the better the residency the lower should be the pay. Many prospective residents simply cannot afford to go on with this view."

"Much that is now regarded as education adds only to the length and not the quality of educational programs."

"Groups are fine but it will not be a good thing if we close-group all of our teaching centers."

"In my day, as resident, we felt we were lucky to get what we got. Our babies were our own responsibility and not that of the community. Residents should have enough to live but demands need not be met in toto."

525 E. 68th St. (21) (Dr. Hinsey).

THE ROLE OF MEDICAL EDUCATION IN CIVIL AND DEFENSE MOBILIZATION

John S. Patterson, B.S., Washington, D. C.

I am grateful for the opportunity to address this group, but let me assure you at the outset of these remarks that I do not speak as an expert on medical subjects. So, for the sake of the medical profession and my responsibility to the federal government, I should like very simply to express to you something of the urgent problem which each of us faces as we live in this age of continuing and accelerating changes.

Although I am not a medical man, I feel curiously at home in this gathering. Your concern with medical education and specialism parallels my concern over some of the major national security problems which we face today. That sounds like an enigma. Let me explain. The crux of your problem is the acceleration and proliferation of scientific knowledge and technological development. In the few years since 1940 we have made more scientific progress than in all man's history up to that time. When you write out a prescription today, the chances are 7 out of 10 that the medicine you call for did not exist 15 years ago.

Science is continuing to accelerate its onrush. If you are five years behind in your thinking now, you are more out of date than your fathers would have been if they had been 25 to 50 years behind in theirs. As you plan ahead to make medical education keep up with progress and to make physicians keep up with medical education, your problems multiply at a discouraging rate. You have to run faster and faster to stand still.

Consider, then, the broader problems of national security which we in the United States face and must learn to solve. Consider the significance of the growth in the power and range of missiles and in the number being produced. Consider the costs of providing adequate protection against fall-out throughout the United States. Consider our international problems: foreign aid and foreign bases, how to handle the Russians, and how to deal with the triple revolution in the underdeveloped areas—the revolution of rising economic expectations, of rising resentment at inequality, and of rising determination to be free and independent.

Our national security problems are formidable indeed. From the vantage point of my office the problem is one of learning to live in a new age—an age when we are under the constant threat of massive attack. And I say this irrespective of the current state of our relations with the Russians or of what their motivations may or may not be. As long as the arsenals of annihilation exist, so too does the threat exist.

We are living in the most perilous and dangerous period of man's history. We have learned how we can all die together, but we have not yet learned how we can all live together.

When you hear people criticize the inadequacy of civil defense preparedness, I hope you will draw the analogy with the problem of medical education. I hope you will remember that we, as a nation, have not really been able to keep up with the increases in the power of destruction during the last decade but we have come a long way from a standing start.

Deputy Director, Office of Civil and Defense Mobilization.

Read before the 55th Annual Congress on Medical Education and Licensure, Chicago, Feb. 9, 1959.

Advances in Defense Preparedness

To illustrate some of the real progress we have made, let me summarize a few of the major developments in civil and defense mobilization readiness during the past year. I will tell you briefly about the creation of my new agency, about the National Plan for Civil and Defense Mobilization, the National Shelter Policy, and our radiologic defense program, and then I will comment on some of the recent developments of medical interest.

The most important action at the federal level was President Eisenhower's Reorganization Plan no. 1 of 1958. This merged the Federal Civil Defense Administration and the Office of Defense Mobilization and created the Office of Civil and Defense Mobilization in the Executive Office of the President.

It gave to the President directly the responsibility for all of the nation's nonmilitary defense. As commander-in-chief, he already had full military responsibility, and he now directs the total defense of the nation.

The President has delegated to the Office of Civil and Defense Mobilization those responsibilities that lie outside the military area. It eliminates duplication of effort and overlapping and conflict of interest and programs. It establishes unified federal guidance and direction. It has given new strength and stature, a proper standing in the federal government, to the critical mission assigned to us.

The most significant action which this new agency has taken to date was the issuance last October of the National Plan for Civil Defense and Defense Mobilization. This is the first time that an over-all plan for nonmilitary defense has ever been developed and circulated. Many months of effort and negotiation went into this plan, which will serve as a guide to the development of civil defense and defense mobilization programs at every level of government and in private organizations as well.

The plan, as issued, is only a beginning. It is just the skeleton and the central nervous system. The flesh and the organs are being developed now in the form of 40 annexes. Each will deal with a particular subject in more detail, describing goals, responsibilities, and jobs to be done. Several of these annexes will be of great interest to you, but particularly the National Medical and Health Plan.

Along with the work on these annexes, we are also readying new executive orders which will delegate specific planning and emergency responsibilities to other federal agencies. The Department of Health, Education, and Welfare, for example, will have the primary responsibility in the medical field.

Another great step forward last year was the adoption by the administration of a National Shelter Policy. This was based on a recognition that shelter from radioactive fall-out offers the greatest potential for saving lives in nuclear attack. The policy calls on citizens and directors of institutions of every sort to create shelter against the hazards of radioactive fall-out.

Each person is obligated to protect himself and his family from fall-out, just as he protects them from severe weather and from hunger. It lays upon federal, state, and local governments the requirement that they provide attack protection for their employees, and the same injunction extends to all institutions, schools, colleges, and hospitals.

The policy also contains the following provisions: (1) intensive education of every American on the possible effects of nuclear attack and the steps that he and his government can take to minimize them; (2) sampling surveys of existing structures to determine their shelter capabilities and what must be done to bring them to standard; (3) accelerated research to show how shelter may best be incorporated in both existing and new structures, to improve shelter design, and to reduce costs; (4) construction by the federal government of a limited number of prototype shelters for various geographical and climatic areas and for various types of construction, including schools and hospitals, insuring that they have practical peacetime uses as well; and (5) setting federal example by incorporating fall-out shelters in federal buildings hereafter designed, as an indispensable stimulation for state and local governments and private investment.

We have issued a general order to all federal departments and agencies to make the last provision effective. The other four require specific appropriations. Our request for funds to activate this policy last summer was caught in the merger of ODM and FCDA, and a tight congressional legislative program schedule. We are renewing our request to the new Congress because it is a sensible approach to a knotty problem and requires federal action.

The corollary of this policy is our program for building radiologic defense everywhere. In any attack, the immediate plotting of the wind and the location of nuclear bursts will give a general indication as to where to look for dangerous fall-out. Four times daily the weather bureau now provides OCDM and the state and local governments with observations of current wind directions and velocities.

Action to be taken by those under cover will be determined by the civil defense authorities in any locality after monitoring or measuring teams, using special radiologic instruments, locate the fall-out where it actually comes down and measure its radiation. A federal network of fixed monitor stations will use the facilities of all federal agencies. In 1959, the federal network will have available 900 fixed monitoring points over the nation, operating around the clock, and, in 1961, 3,000.

To provide for state and local monitoring, OCDM has bought 800,000 radiologic instruments, which are being distributed to state and local governments. Beginning in September, 1958, radiologic kits have been delivered to 6,000 high schools and colleges, with an additional 9,000 schools to receive them by June, 1959. Through the cooperation of the Department of Health, Education, and Welfare and the state education departments, science teachers in these schools are conducting instruction in the effects of radioactive fall-out, measurement, and monitoring. More than 1 million students will receive such instruction by June, 1959. Cities and states, within their police, fire, and health departments, are already conducting radiologic defense schools. More than 100,000 city and state employees will be instructed by June, 1959. I know that you will agree that these developments, present and projected, will enhance greatly our readiness as a nation to survive attack.

Program for the Medical Profession

Now let me turn to the specifically medical part of this job. I mentioned that we are preparing a delegation to the Department of Health, Education, and Welfare to take the leadership in this field. The proposal to make this comprehensive delegation was discussed fully by Governor Hoegh with the American Medical Association's Council on National Defense, and the A. M. A. heartily endorsed our action. The department will be responsible, through the Public Health Service, for planning and guiding emergency health and medical services, developing national medical casualty and preventive health services, developing a national emergency water supply plan, training emergency health and medical personnel, conducting research in medical and public health emergency measures, and continuously evaluating civilian health and medical resources and requirements.

The magnitude of the job for which the Public Health Service must plan is staggering. In the event of an attack, casualties in need of medical care could be measured in the tens of millions. Great numbers of people would be displaced with resultant increases in daily morbidity. Every able-bodied person would be working to the point of exhaustion. Those with chronic disease would be deprived of their usual attention in homes and clinics.

Premature births, miscarriages, and complications of delivery would increase. Accidental injuries would increase. With the disruption of utilities and the destruction of housing, extensive public health problems may be anticipated. Exposure to the elements and overcrowding in homes and mass-care shelters would intensify the threats of major epidemics of a wide variety of communicable diseases.

Chaos would be further increased by a lack of communications, transportation, and supplies. Finally, the widespread contamination by radioactive fall-out with effects lasting for days or weeks (combined with the delayed radioactive effects) completes a picture of great peril. In the face of this massive and terrifying problem, the health forces of the nation which must form the nucleus of the survivor care job are not now in a state of readiness from a civil defense standpoint for an emergency of these dimensions.

Under our delegation, the Public Health Service, working with the medical and nursing profession, medical educators, hospitals, and public health authorities, will give real impetus to our drive toward overcoming this lack of national health preparedness. The program will be based on the civil defense organization now in being. It will bring to bear the full resources of the Public Health Service in support of the medical profession and the health authorities. At the local level, the Public Health Service will utilize reserve corps to recruit and train physicians and other members of the health team in civil defense as it relates to medical care, preventive medicine, and special measures required in the defense against chemical warfare, biological warfare, and the problems of radioactive fall-out. Each trained person will provide the community with the competence to organize, plan, train, and rehearse its civil defense health personnel. These officers will work closely with state and local organizations already engaged in civil defense work. Thus, there will be a network of trained personnel to provide leadership, to give competent support to state and local organizations, and to coordinate community civil defense efforts.

Let me emphasize one point. Our ultimate limiting resource will be trained personnel. We can stockpile medical supplies and equipment, and we plan to. We cannot stockpile physicians. That is why strong programs of medical education are so vitally necessary.

OCDM, in the amount of $135,000, is backing the program of Medical Education for National Defense —the MEND program—on an equal basis with the Army, Navy, and Air Force, to acquaint instructors with medical problems anticipated in any national disaster so that graduates will be better prepared to assume the responsibilities of military or civil emergency medicine.

With the A. M. A., we have a $150,000 contract that is somewhat related to the MEND program and of great importance to the nation. The A. M. A. will study, develop, and recommend the planning, training, and operational organization needed for a national emergency care plan. We expect recommendations to cover (1) the use of professional and nonprofessional personnel of the medical and related professions before and immediately after attack; (2) the functions and responsibilities of the medical profession that may be delegated and performed by other health personnel; and (3) the training and education needed by health personnel, professional and nonprofessional, for wartime operational capability and the sorting of casualties.

Finally, we have given the National League for Nursing an $80,000 contract to develop a civil defense content for nursing education, both undergraduate and advanced. Massachusetts General Hospital, Skidmore College, Columbia University, and the University of Minnesota all are working on various phases of this 18-month undertaking.

I think the Association of American Medical Colleges is to be warmly commended because its members themselves recognize the need for developing simpler, faster ways of doing things. We stress the need for priorities of medical service and conservation of scarce skills in postattack planning, and the same principles must be applied in medical education as well as in other walks of life.

I also compliment the A. M. A. and the Association of American Medical Colleges for establishing the Liaison Committee on Medical Education for National Defense as a joint standing group for dealing with the medical education problems in a mobilization or a disaster situation. This should be of great service to us, as will your current joint program to send a questionnaire to all medical schools, to assist and encourage the schools to develop the information and do the planning necessary to preserve the faculty structure and function in a national emergency. The information this questionnaire will produce also will be most useful to OCDM in health manpower planning.

A very encouraging and constructive action to assure continuity of medical education has been put forward by the chief medical director of the Veterans Administration, Dr. William S. Middleton. He has stated that VA hospitals, particularly in nontarget areas, would be willing to plan with medical schools for the relocation of schools whose facilities are destroyed. A few schools, notably the University of Oklahoma, have made rather extensive plans with specific hospitals. We need more of this type of initiative.

All of these aspects of medical preparedness are important to our nation's emergency readiness. There are really only two basic elements to the kind of nonmilitary defense this nation must have: people, as individuals, and government, at all levels. Both need all of the help they can get, not only from the A. M. A., but from all other organized groups, professional or social.

We in government are doing our best for nonmilitary defense. We know that you—individually and collectively—will do likewise. No one could ask for anything more.

SPECIAL ARTICLE

NOMENCLATURE OF BLOOD CLOTTING FACTORS

FOUR FACTORS, THEIR CHARACTERIZATION AND INTERNATIONAL NUMBER

International Committee on Nomenclature of Blood Clotting Factors

Physicians often accuse basic scientists, chemists and physicists in particular, of using a strange language which no one outside their own subject can understand, but at least the majority of physicists or chemists can understand what others in their own field are talking about. The field of blood coagulation is one in which medical men and biological scientists have created such chaos that they do not even understand what other workers in the field are talking about, far less the clinician or the medical student.

To improve international communications is a worthy object at any time; to do so in the field of clotting factors has proved a task of major difficulty. To bring together the major workers not only from different countries but from the same country, hold them together, and persuade them of the importance of a simple understandable classification has been the problem for the chairman of the International Committee on Nomenclature of Blood Clotting Factors. This activity, of course, has much wider significance than just the field of blood clotting factors, and evidence for this wider significance has been the invitation by the National Advisory Heart Council of the United States to the members of this committee to or-

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Members of the Committee are Drs. Irving S. Wright, New York Hospital (chairman); Prof. R. B. Hunter, Department of Pharmacology and Therapeutics, Queen's College, Dundee, Scotland (vice-chairman); T. Abe, Tokyo University Medical College; B. Alexander, Harvard Medical School, Boston; Tage Astrup, Biological Institute, Carlsberg Foundation, Copenhagen; Kenneth Brinkhous, University of North Carolina Medical School, Chapel Hill, N. C.; E. Deutsch, University of Austria Medical School, Vienna; P. Fantl, Baker Medical Institute, Alfred Hospital, Melbourne; H. Hartert, Medizinische Universitatsklinik (Ludolf-Krehl Klinik), Heidelberg, Germany; L. B. Jaques, Department of Physiology, University of Saskatchewan, Saskatoon, Canada; H. Jensen, U. S. Army Medical Research Laboratory, Fort Knox, Ky.; Prof. E. Jorpes, Karolinska Institute, Stockholm; F. Koller, Chefarzt der Medizinischen Abteilung der Krankenanstalt, Neumunster, Zurich, Switzerland; K. Lenggenhager, Direktor der Chirurgische Universitatsklinik, Bern, Switzerland; R. G. Macfarlane, Radcliffe Infirmary, Oxford, England; Willy Merz, University Clinic of Obstetrics and Gynecology of Lausanne, Lausanne, Switzerland; Pietro de Nicola, Pavia, Italy; Prof. P. A. Owren, Overlege, Rikshospitalet Medisinsk, Oslo; Alfredo Pavlovski, Buenos Aires; Armand Quick, Marquette University School of Medicine, Milwaukee; Laszlo Roka, Institute for Vegetativi Physiologie der Universitat, Frankfurt/Main Sud, Germany; Walter Seegers, Wayne University College of Medicine, Detroit; Pierre Soulier, Paris; and Marc Verstraete, Laboratoire de Physiopathologie, Louvain, Belgium (secretary).

ganize a series of international conferences within this field and to invite to these conferences young workers of exceptional promise so that they may listen to the discussion and benefit from the contact with their older colleagues from different countries in the world. The committee, therefore, is making a major contribution to international communications in medicine, and it is hoped that this type of activity will be seen more frequently as the world grows smaller and nations more fully accept the necessity for living and working together.

Work of the Committee

The story of this committee's work began at the first International Congress on Thrombosis and Embolism held in Basel in 1954, when the multiple names for identical substances emphasized that the problem of international communication was a serious one in this field. The International Committee for the Standardization of the Nomenclature of Blood Clotting Factors was established. Twenty-two members from 15 different countries were initially appointed. The list included the leading workers in the field, and most of the factors recently recognized had been discovered by these men. The first meeting brought into the open the fact that they had to a considerable extent created the problem, and they recognized that they had a moral and scientific responsibility to unravel it. It became clear that, though they had a paternal pride in the names of their choice, without their cooperation and compromise no progress could possibly be made. The efforts made by the members of the committee to yield their own strong positions for the common good have been noteworthy.

One of the first decisions made by the committee was that, whatever system of nomenclature was proposed, names should be avoided which implied an action by any factor. The reason for this had become clear when factors which previously had been given names implying function later were proved to have not that function but a different one. It was agreed that symbols should be used to designate blood coagulation factors until ultimately they were defined and identified in physical and chemical terms. However, certain essential physical and chemical data would have to be presented in support of the identity of any factor before the committee would give it an international symbol.

With further study and negotiation over a three-year period, it became evident that only a numerical system fully met these qualifications, and since some factors had already received Roman numerals in addition to their names it seemed logical to consider whether Roman numerals would be suitable as the international symbolic code, allowing the author freedom to use whichever synonym he wished. Thus, one would write factor V (proaccelerin), or factor V (labile factor). The Roman numeral would be intelligible in all languages, including the Oriental. The first four factors are widely known by their names and some identified chemically, and Roman numerals are perhaps less necessary. They are factor I, fibrinogen; factor II, prothrombin; factor III, thromboplastin (tissue); and factor IV, calcium. It seems likely that these names will continue in common usage, and in fact very few other names have been used for these factors.

One of the great problems facing the committee was to decide when sufficient evidence was available to justify any factor or activity being assigned a number. The following points were agreed on: 1. The minimal requirements for characterization of a clotting factor in whole blood, plasma, or serum shall be valid data on the reproducible effect on storage, adsorbability, inactivation by heating, and effect of pH. Additional chemical data are considered highly desirable if available. 2. A clinically identifiable state associated with an abnormality in the clotting mechanism shall be regarded as supporting the evidence for the lack or excess of a factor. 3. Methods of assay of physiological properties shall be listed. An appropriate selection of these methods will be considered as minimal for presentation of a factor before the criterion committee. In the case of previously undescribed factors the mechanism used for identification shall be clearly described by the author for study and possible acceptance by the committee.

Summary of Factors V, VII, VIII, and IX

The committee proposes to publish in detail elsewhere the criteria on which they have based their recommendation that four further blood coagulation factors should be recognized and assigned international symbols, namely, factor V, factor VII, factor VIII, and factor IX. A brief summary, however, is presented here.

Factor V.—Synonyms for factor V (Owren) include proaccelerin (Owren), labile factor (Quick), plasma ac-globulin (Ware and Seegers), thrombogene (Nolf), prothrombinase (Owren), prothrombokinase (Milstone), PPCF—plasmin prothrimbins—conversion factor (Stefanini), component A of prothrombin (Quick), prothrombin accelerator (Fantl and Nance), and cofactor of thromboplastin (Honorato).

Deficiency of this factor results in a hemorrhagic diathesis which is probably inherited and has been described as a parahemophilia or hypoproaccelerinemia. The first cause was recognized and described by Owren[1] in a beautiful study carried on under the most adverse conditions during the Nazi occupation of Norway, while Owren was at the same time an active member of the underground resistance. Several additional cases have since been described. This factor seems necessary for the formation of the prothrombin converting substance in the blood and in tissue extracts. Other interesting properties are fully described in the literature.[2]

Factor VII.—Synonyms for factor VII (Koller) include proconvertin (Owren), SPCA—serum prothrombin conversion accelerator (deVries, Alexander), stabile factor (Stefanini), cofactor V (Owren), serozym (Bordet), kappa factor (Sorbye and Dam), prothrombinogen (Quick), cothromboplastin (Mann and Hurn), serum accelerator (Jacox), prothrombin conversion factor (Owren), and prothrombin converting factor (Jacox).

Factor VII plays a part in the production of at least three groups of abnormal states: 1. A congenital deficiency may produce hemorrhagic phenomena with purpura and bleeding from the mucous membranes. Many such cases have been described. 2. Acquired deficiency may occur in liver disease, in vitamin K deficiency, in the immediate neonatal period, and after the administration of prothrombinopenic agents, such as the coumarin derivatives used in anticoagulant therapy. 3. Excesses of factor VII have been found in certain states associated with a high incidence of thromboembolism, such as the third trimester of pregnancy. The level of this substance in the blood is species specific. Deficiency results in a quantitative prolongation of the one-stage prothrombin time test. Factor VII accelerates the conversion of prothrombin to thrombin in the presence of tissue thromboplastin, factor V, and calcium (Ca^{++}). It does not accelerate the interaction of platelet factor 3 and factors VIII and IX. It cannot rectify retarded coagulation due to factor V deficiency. It is not essential for thromboplastin generation in the coagulation of blood. Other interesting properties are fully described in the literature.[3]

Factor VIII.—Synonyms for factor VIII (Koller) include antihemophilic globulin (Patek and Taylor), antihemophilic globulin A (Cramer), AHF—antihemophilic factor (Brinkhous), PTF—plasma thromboplastic factor (Ratnoff), plasma thromboplastic factor A (Aggeler), TPC—thromboplastic plasma component (Shinowara), facteur antihemophilique A (Soulier), thromboplastinogen (Quick), prothrombokinase (Feissly), platelet cofactor (Johnson), plasmokinin (Laki), and thrombokatilysin (Leggenhager).

Factor VIII deficiency represents the classic hemophilia A, well known as the hereditary hemorrhagic disease which occurs almost exclusively in males but which is female sex-linked. The degree of factor VIII deficiency varies from patient to patient. Hemorrhage occurs in any tissue after minor injuries and is frequently serious. Factor VIII enters into the early stages of coagulation with factor IX and calcium ions to produce an intermediate product which reacts with platelet factor 3. The result of this reaction in the presence of factor V is an active agent in prothrombin conversion. It is essential in the formation of blood thromboplastin. A deficiency (1) prolongs the clotting time, (2) diminishes the thromboplastin formed, and (3) diminishes the prothrombin conversion.[4]

Factor IX.—Synonyms for factor IX (Koller) include Christmas factor (Biggs and Macfarlane), PTC—plasma thromboplastic component (Aggeler), antihemophilic globulin B (Cramer), plasma thromboplastic factor B (Aggeler), plasma factor X (Shulman), and facteur antihemophilique B (Soulier).

Factor IX deficiency produces hemophilia B or Christmas disease, named after the now-famous patient of Biggs and Macfarlane. This is usually a severe hemorrhagic disorder resembling hemophilia A and inherited in the same way. Studies of this disorder led to the discovery of factor IX. Factor IX, like factor VIII, is essential for the formation of intrinsic blood thromboplastin. It probably enters into reactions leading to the formation of this thromboplastin with calcium ions and factor VIII, an intermediate product which then reacts with platelet factor 3 and factor V. It influences primarily the amount of thromboplastin formed and not the rate of its generation.[5]

New Factors Under Consideration

A number of additional plasma and serum factors have been described by various workers who believe they have established that they play a role in physiological clotting of blood. These factors are now under study by the committee, and if the evidence indicates that the claims are valid they will be assigned a Roman numeral.

The ultimate contribution of this committee to medical understanding and education will depend on the willingness of educators, editors, and authors to adopt this system in their day-to-day efforts to create the medical thinking and literature of the future.

525 E. 68th St., New York 21 (Dr. Irving S. Wright).

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DIAGNOSTIC PROBLEMS

PROGRESSIVE PULMONARY INSUFFICIENCY IN A 57-YEAR-OLD WOMAN

Clinical Pathological Conference (PM 1346-58), Oct. 9, 1958, from the Department of Pathology and the Hektoen Institute for Medical Research of Cook County Hospital, Chicago, presented for publication by Daniel S. Kushner, M.D., and Paul B. Szanto, M.D.

Clinical Data

A 57-year-old woman was admitted to Cook County Hospital on June 27, 1958, with complaints of profuse night sweats, intermittent high fever, and weakness of three weeks' duration. She also complained of headache, exertional dyspnea, and slight orthopnea, but no edema. She had had bronchial asthma for 32 years with intermittent symptoms, well controlled with ephedrine and proprietary drugs. History revealed measles, mumps, chicken pox, and whooping cough in childhood; several hospitalizations between 1928 and 1937 for bronchial asthma; and an admission for "bronchial pneumonia." She had been told she had a fibroid uterus, but she had refused an operation. Menarche occurred at the age of 9; menses had been regular, and her last menstrual period had occurred 12 years previously. She had been pregnant once but aborted. The patient had been born in Mississippi and had lived in Chicago for 26 years. She had worked for four years (about 1929) running machines in a dusty factory "making glue for paper work."

Physical examination disclosed an extremely obese, dyspneic, middle-aged woman with a relentless, violent, nonproductive cough. Her skin was dry and sallow. She was cyanotic, but had no clubbing of the digits. Her blood pressure was 106/70 mm.Hg., pulse 120 per minute, respirations 40 per minute, and temperature 102 F (39 C). Her scalp hair was "dry and falling out." Her facial features were masculine and hirsute. Funduscopic examination was negative. Diffuse rales and wheezes were heard throughout both lung fields. The heart was not enlarged; apical and radial rates were 120 per minute and regular, and no murmurs were heard. Her abdomen was obese, and no organs or masses were palpated. The extremities were normal; neurological examination and pelvic and rectal examinations gave negative results. A stool benzidine reaction was negative.

Urinalysis was normal. The hemoglobin level was 12.8 Gm. per 100 cc. (82%); the leukocyte count was 9,400 per cubic millimeter, with platelets adequate; the differential count revealed 44% neutrophils, 3% band forms, 10% eosinophils, 1% basophils, 32% lymphocytes, 7% monocytes, 1% myelocytes, and 2% metamyelocytes; 1+ anisocytosis, polychromatophilia, and 2+ toxicity were noted. A subsequent hemogram, on July 28, 1958, revealed a hemoglobin level of 16.1 Gm. (103%); leukocyte count 15,200 per cubic millimeter, with a differential count of 87% neutrophils, 1% eosinophils, 9% lymphocytes, and 3% monocytes; 1+ anisocytosis and toxicity. The hematocrit reading was 58% and 56% on two occasions. L. E. cell preparation was negative. Prothrombin time was 16 seconds (control 12 seconds). The blood Kahn reaction was negative. The blood urea nitrogen level was 12 mg. per 100 ml., total protein 6.7 Gm. per 100 ml., gamma globulin 1.32 Gm. per 100 ml., calcium 11.4 mg. per 100 ml., and cholesterol 148 mg. per 100 ml.; the sodium level was 142 mEq. per liter, potassium 7.3 mEq. per liter, and chloride 98 mEq. per liter; the icterus index was 8, cephalin flocculation 0, thymol turbidity 2.4 units, and carbon dioxide–combining power 32 ml. per 100 ml. Serum electrophoresis revealed only a slight increase in alpha$_2$ globulin.

Dr. Kushner is Associate Director of Medical Education, Cook County Hospital, and Instructor in Medicine, Northwestern University Medical School; Dr. Szanto is Director, Department of Pathology, Cook County ital, and Professor of Patholgy, Chicago Medical School.

strong is Director of Medical Education, Cook County Hos- ssor of Medicine, University of Illinois.

Electrocardiograms showed a semivertical electrical axis with clockwise rotation and prominent broad P waves, especially in leads 2 and AVF.

Roentgenogram of the chest revealed that the heart size was normal. The pulmonary artery segment was enlarged. Many miliary-sized nodules were scattered uniformly throughout both lungs. In addition to the small nodular densities, a homogeneous density in the left lung spared the left apex and left base. On July 7, the small nodular lesions appeared less discrete. On July 21, the small nodular lesions appeared slightly larger. On July 30, the homogeneous density in the left lung appeared denser. On Aug. 22, there was confluence of the nodular lesions in the right lung. The homogeneous density in the left lung appeared still denser.

Smears and cultures of bronchial secretion and sputum on three different occasions gave negative results for acid-fast bacilli. Mycologic culture of the sputum was negative. A tuberculin skin test gave positive results (1:10,000); skin tests with histoplasmin, blastomyces vaccine, and coccidioidin gave negative results. Arm-to-tongue circulation time (with use of sodium dehydrocholate [Decholin sodium]) was 8 to 10 seconds.

Bronchoscopy was negative. Pulmonary function studies on July 17 (see table) indicated marked arterial unsaturation and hyperventilation. Attempts to measure oxygen diffusing capacity were unsuccessful. Cardiac catheterization revealed pulmonary and right ventricular hypertension and elevated cardiac output but no evidence of heart failure. Further pulmonary function studies were not completed because of the patient's respiratory distress. Examination of a right scalene lymph node removed by biopsy revealed chronic lymphadenitis.

After an initial slight improvement, the hospital course was one of inexorable progression of dyspnea, cyanosis, and paroxysmal cough, productive of greenish sputum in small amounts, vague chest pain, increasing weakness, fatigue, anorexia, nausea, mental confusion, and faintness. The patient was generally afebrile, with occasional temperatures recorded at 100 F (37.8 C) and a single elevation to 101.2 F (38.5). She was treated with penicillin, streptomycin, isoniazid, para-aminosalicylic acid, pyridoxine, intermittent positive-pressure oxygen inhalation, ephedrine, epinephrine, aminophylline, codeine, potassium iodide, promazine, and aluminum hydroxide. Steroid therapy was instituted on July 26 with corticotropin and hydrocortisone and was subsequently maintained with cortisone. Considerable euphoria was its only apparent effect.

The patient was digitalized on Aug. 15. Her respiratory rate remained above 40 per minute, with forced, prolonged expirations, somewhat relieved symptomatically by aminophylline. There was tachycardia (pulse rate 140 per minute), tachypnea (respirations 46 per minute), and increased cyanosis. The patient died on Aug. 29, 1958, after a duration of illness of 11 weeks.

Clinical Discussion

Dr. S. Howard Armstrong Jr.: We have to consider the problem of a 57-year-old woman with an acute illness, characterized by chills, fever, and night sweats, suggesting an acute infection superimposed on at least 30 years of chronic respiratory disease.

She was born in one of the southern states and, at the time she is said to have acquired bronchial asthma, she had had a four-year exposure to a dusty factory where she worked making glue. What relationship does the paper industry bear to chronic pulmonary disease? The cellulose fiber itself has not been incriminated in the development of pneumoconiosis. A chronic pneumonitis is associated with both the sugar cane cellulose fiber and the cotton cellulose fiber. Bronchial asthma has been rarely associated with prolonged exposure to cotton cellulose. However, paper is made from wood, and wood is very sporadic in its capacity to produce allergy. This varies with wood species, and cabinet-makers do occasionally develop allergic symptoms. On the other hand, exposure to the fine sawdust of most woods results in nothing more than sneezing and coughing. Red cedar wood has produced allergic *manifestations but is not often used in paper.*

Physiological Data Obtained by Right Heart Catheterization

	Observed	Normal
Arterial blood		
Oxygen saturation, %	62	96-98
Carbon dioxide content, vol. %	45	45-50
Pressures, systolic/diastolic, mm. Hg		
Right atrium	12/0	0 to 3/0 to —3
Right ventricle	73/2	18 to 30/4 to 5
Pulmonary artery	73/27	18 to 30/6 to 12
Flow, cardiac output, liters/min.	8.05	5.3-7.0
Ventilation		
Oxygen uptake, ml./min.	361	225-300
Ventilation, *liters/min.*	11.2	5.6-7.5
Ventilatory equivalent	3.1	2.5

With regard to glue, the older varieties were made from gelatin, which is not an allergenic substance and, more recently, casein and urea resins. Only more recently have other allergenic materials come into the glue industry. These are the synthetic epoxyresins which require an activator and which do cause apparent allergic reactions in the skin and respiratory tract. Finally, in paper factories, the processing of fibers is usually a wet process, and the dust content is not high.

Historically, the patient was said to have had uterine fibroids, suggesting the remote possibilit *multiple pulmonary abscesses from necr* were infected degenerated fibroids. The pa lining t in some ar and hirsutism at least raise the question of adrenal cortical hyperfunction (Cushing's syndrome). Although she had 12% eosinophils, the hypereosinophilia of polyarteritis nodosa and of allergic disease cannot be as readily eliminated by the administration of corticosteroids as can the normal eosinophilia. Therefore, while one cannot use the eosinophilia to exclude a state of hyperadrenal corticism, it is quite possible that the obesity and hirsutism are on the more common hereditary or familial basis. I wonder about the character of her respirations.

Dr. George River: Her respirations were shallow and rapid. There was no evidence of supraclavicular retraction.

Dr. Armstrong: Then she probably did not have bronchiolar obstruction. Apart from an initial temperature of 102 F (38.9 C), her course was quite afebrile. Her heart was apparently of normal size, and she had little roentgenographic evidence of cor pulmonale. Bacteriologically, despite the fact that she had a constant, unrelenting, hacking cough, smears and cultures of both sputum and bronchial secretion revealed neither tubercle bacilli nor fungi. She did not expectorate material suggesting chronic bronchiectasis, lung abscess, or necrotic carcinoma. Skin tests gave negative results, except for the tuberculin test, which informed us that she had at one time responded immunologically to a tuberculous exposure. Some patients with generalized sarcoidosis (Boeck's sarcoid) have been known to develop a terminal miliary tuberculosis with a positive tuberculin skin reaction, and, therefore, one cannot exclude sarcoidosis on the basis of a positive Mantoux reaction. But this would be most peculiar miliary tuberculosis in a patient who had two months of specific antimicrobial therapy, with not only no change but actual progression of the roentgenographically defined pulmonary lesions.

With regard to the cardiopulmonary physiological evaluations, the first simple test gave a circulation time of eight seconds. This is unusually rapid and, together with the desaturation of the arterial blood (62% oxygen saturation) in this patient, forces consideration of the differential diagnosis between a pulmonary diffusion barrier with right heart failure and the possibility of a shunt. The remainder of the data showed a cardiac output of 8 liters, which, expressed in terms of cardiac index, would probably be just above the upper limits of normal. The right ventricular and pulmonary arterial pressure were elevated.

Among obstructive diseases of the pulmonary arteries, one must consider multiple pulmonary emboli, for which there is no evidence here. In sum, the physiological data, interpreted in the light of clinical findings, suggest that the arterial oxygen [illegible] and pulmonary hypertension are the result of a diffuse parenchymal pulmonary process, offering some barrier to both gaseous diffusion and blood flow.

With the etiology undefined, after the course of various therapeutic trials, the pulmonary lesions tended to become larger and more confluent. The adrenal corticoids were probably given for the remote possibility of polyarteritis of the lung, with eosinophilia. Many unrelated types of pulmonary parenchymal disease of undefined etiology, including berylliosis, sarcoidosis, and the Hamman-Rich syndrome,[1] do respond somewhat to corticosteroid therapy, especially if treated early. The commonest lesion for a patient, even a woman in her 50's, with this history and findings, is carcinoma of the lung. Carcinoma of the lung may be silent while infection occurs behind it, resulting in night sweats, chills, and fever. A single or multiple abscesses may become walled off. Antibiotics result in only temporary remission; then the process progresses. Carcinoma of the lung does not necessarily produce a hematogenous spread; it may undergo miliary lymphatic spread, producing the type of lesions described roentgenographically in the patient.

In summary, this patient is an old asthmatic who has had some degree of pulmonary hypertension and a moderate amount of pulmonary arteriosclerosis. She more recently acquired carcinoma of the lung and developed lymphatic dissemination, which is much more likely to accentuate asthmatic symptoms than hematogenous dissemination with big nodules of metastatic tissue.

Dr. William Meszaros: The roentgenographic findings suggested diffuse miliary lung lesions with progressive confluence; miliary tuberculosis or carcinomatosis would produce this appearance. The homogeneous infiltration in the left lung is compatible with either chronic pneumonitis or neoplastic disease. From the roentgenologic point of view, an analysis of nodular pulmonary lesions includes consideration of inflammatory infections of bacterial, viral, or fungus etiologies. As far as neoplastic diseases are concerned, miliary metastases are quite common. The large lesion in the left lung would be hard to reconcile with metastasis. The absence of pleural effusion and the patient's rapid deterioration speak against inflammatory lesions, including tuberculosis. I would think the most likely possibility is bronchogenic carcinoma.

Dr. Louis Feldman: Within one month, this patient developed polycythemia. This again raises the question of a pulmonary diffusion barrier versus a cardiac shunt.

Dr. William Buckingham: Unfortunately, attempts to do a diffusion study using the Riley technique were unsuccessful because of the poor condition of the patient.

Dr. Earl Zaus: From the point of view of the radiologic changes, tuberculosis would not be the first thing to consider. Outstanding considerations would be (1) pulmonary adenomatous carcinoma, (2) lesions that belong to the interstitial fibrosing group, (3) fungus infection, and (4) the collagen diseases. This type of picture is not common in collagen disease. In 111 reported cases of polyarteritis nodosa, 14 of the patients had characteristic pulmonary findings of granulomatous lesions, not resembling those seen here. The same 14 also had a characteristic clinical picture.

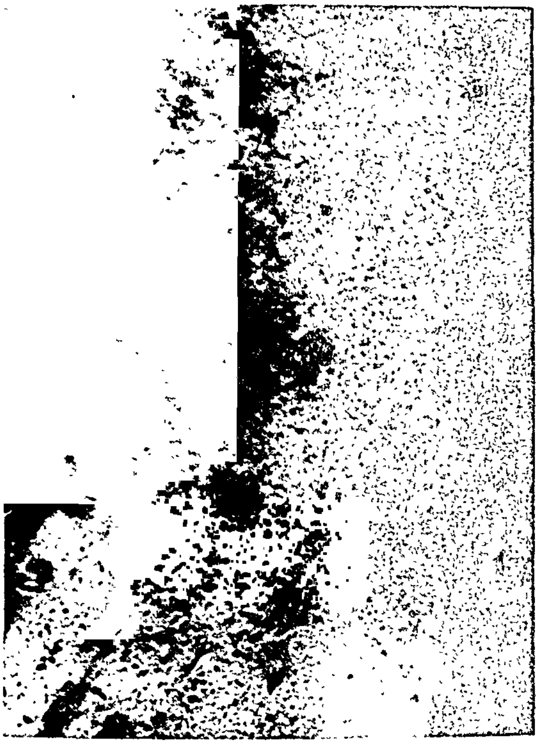

Fig. 1.—Extensive consolidation of lung seen on cut surface. Honeycombed appearance is due to emphysema.

Question: Why wasn't biopsy of the lung done, as the easiest way to confirm a diagnosis?

Dr. River: We had planned to do a lung biopsy, but the patient initially refused, and subsequently her condition rapidly deteriorated.

Clinical Diagnosis.—The clinical diagnosis was bronchogenic carcinoma with diffuse lymphangitic spread, superimposed on chronic bronchial asthma with pulmonary hypertension and pulmonary arteriosclerosis.

Pathologist's Report

Dr. Paul B. Szanto: At autopsy the heart was moderately enlarged (380 Gm.), due to moderate hypertrophy of the right ventricle. Histologically, the epicardium showed some lymphocytic infiltration. The liver (1,200 Gm.) and spleen (125 Gm.) showed passive congestion. The uterus was enlarged with fibroids. The adrenals were normal.

The lungs were heavy (1,200 Gm.). The pleura was smooth and shiny. The mucosa of the bronchial tree was injected; no endobronchial lesion was present. The consistency of the lungs was uniformly firm due to diffuse consolidation, and the cut section of both lungs showed a brown-pinkish-tan color (fig. 1). Large sections taken from the various segments of all lobes of both lungs revealed a fairly uniform involvement (fig. 2 and 3) of the emphysematous lungs. Only scattered small foci of distended air-containing alveoli remained uninvolved.

The lining epithelium of the bronchi was everywhere well preserved. The basement membrane of the bronchi was thickened, as seen in instances of long-standing bronchial asthma. The muscular layer was also thickened and infiltrated by lymphocytes as evidence of chronic bronchitis. Some pulmonary arteries showed intimal thickening with extreme narrowing of the lumen. The lumen of one medium-sized pulmonary artery was almost occluded by an organized thrombus.

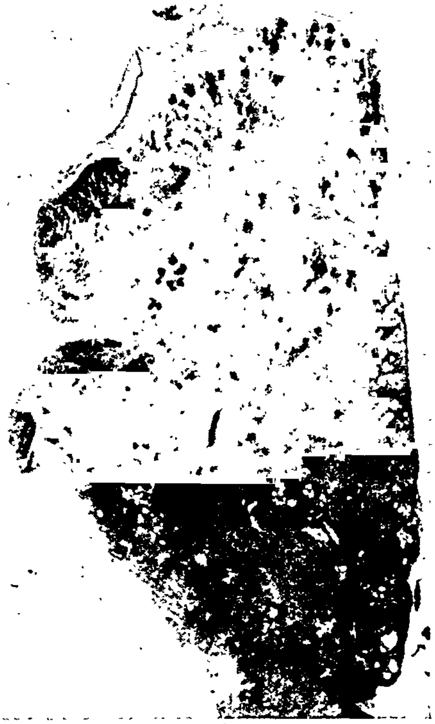

Fig. 2.—Section through apical segment, showing uniform infiltration of alveoli. A few dilated alveoli appear in periphery of section.

The bronchi of the third order showed clus[illegible] of tumor cells invading their walls but not invol[illegible] the mucosa proper. All the alveoli were unifor[illegible] involved and were lined by columnar epithel[illegible] cells of variegated appearance, with pleomor[illegible] and hyperchromatic nuclei. Occasionally, there were papillary projections of the tumor cells lining t[illegible] alveoli (fig. 4). The alveolar septums in some ar were delicate, whereas others showed fibrous thickening. It should be pointed out that the slender connective tissue septums do not necessarily represent alveolar septums; septate stroma has been observed also in lymph node metastases of carcinomas of this type. The lumen of the bronchioles contained numerous desquamated columnar epithelial cells, *intermingled with pleomorphic tumor cells.*

On the basis of these findings, this is an alveolar cell tumor or, more properly, bronchiolar cell carcinoma, since it originates not from the alveolar but from the bronchiolar lining cells. Distant metastasis of this type of tumor is not frequent. In this case, the bronchial lymph nodes were not involved, but the left paratracheal lymph nodes were moderately enlarged due to replacement by tumor tissue.

We have recently observed in another case a circumscribed, nodular, and histologically better differentiated type of bronchiolar cell carcinoma in a 77-year-old woman. The apical segment of the left lower lobe revealed an indistinctly outlined gray-white gelatinous tumor measuring 2 by 2 cm. Microscopically, the alveoli in the area of the tumor were lined by high columnar epithelial cells, uniform in appearance, with the nuclei at the base of the cells (fig. 5 and 6).

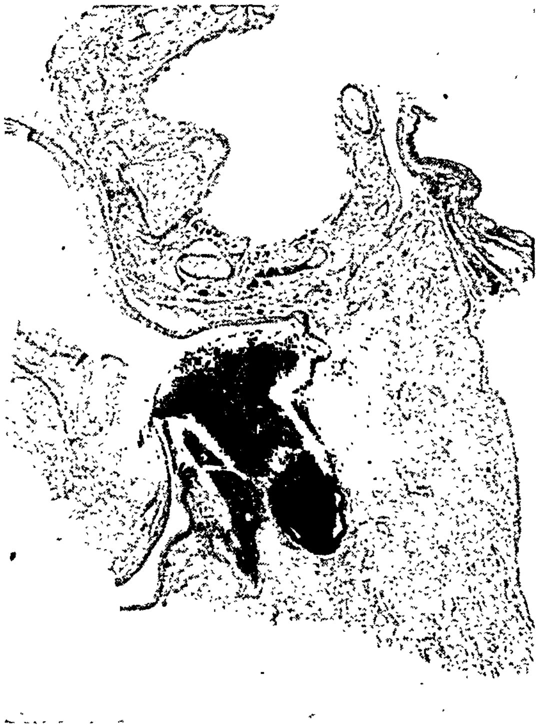

Fig. 3.—Uninvolved bronchus with uniform infiltration of adjacent alveoli.

The Pathological Diagnosis.—The pathological diag-[illegible] was bilateral diffuse bronchiolar (alveolar [illegible]inoma; secondary diffuse pulmonary fibro-[illegible]trophy of the right ventricle; metastasis to the tracheobronchial lymph nodes; passive congestion of liver and spleen; obesity; and uterine fibromyomas.

Comment

Dr. Szanto: Malignant tumors of the lung are classified as (1) primary epithelial tumors, including bronchial adenoma (carcinoid and cylindroma), bronchogenic carcinoma (epidermoid carcinoma adenocarcinoma, undifferentiated large cell carcinoma, and undifferentiated small [oat cell] carcinoma), and bronchiolar carcinoma; (2) sarcoma including undifferentiated (pleomorphic) sarcoma differentiated fibrosarcoma, leiomyosarcoma and chondrosarcoma; (3) carcinosarcoma; (4) mesothelioma; (5) lymphoma (lymphocytic lymphosarcoma and Hodgkin's disease); and (6) metastatic carcinoma and sarcoma. (Bronchial adenomas are histologically benign tumors. The cylindrical type of adenoma has a tendency toward invasion of the wall. Bronchial adenomas may metastasize to the regional lymph nodes.)

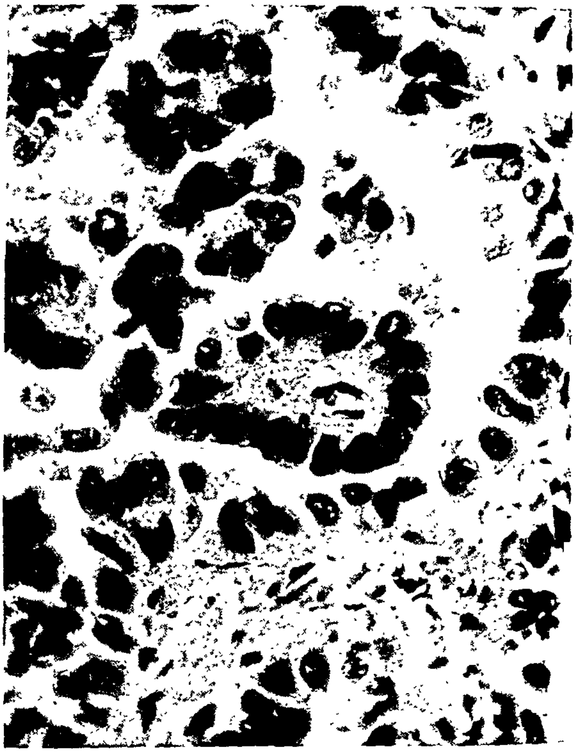

Fig. 4.—Lining of alveoli by columnar epithelium with large pleomorphic, hyperchromatic nuclei.

Adenocarcinoma of the bronchus may possibly originate from large bronchi or from smaller segmented bronchi in the periphery of the lung; then the differential diagnosis between peripheral adenocarcinoma and bronchiolar carcinoma may become difficult. I would stress, however, three points of importance: 1. Adenocarcinoma of the bronchi metastasizes early and widely by the hematogenous route; distant metastasis from bronchiolar carcinoma is rare, as pointed out before. 2. Bronchiolar carcinoma is usually better differentiated than adenocarcinoma. 3. Bronchiolar carcinoma fails to show necrotic changes.

The term bronchiolar adenoma, one of the many synonyms of bronchiolar carcinoma (primary multiple alveolar cell tumor, pulmonary alveolar adenomatosis, alveolar cell carcinoma, diffuse lung carcinoma, diffuse primary alveolar carcinoma, multicentric alveolar cell carcinoma, papillary gelatinous alveolar carcinoma, and bronchiolar carcinoma), has been used [2] because of the relatively benign histological appearance of the tumor, but I would stress that despite their benign histological appearance, these tumors are always malignant. The etiology of alveolar cell carcinoma is intriguing because a similar type of pulmonary lesion has been observed in sheep as a rapidly progressive process, endemic to South Africa, interpreted as a viral infection. It is known as jagziekte, and it results in death of the affected animal two to eight months after onset. It is stated that bronchiolar carcinoma makes up about 5% of all lung tumors in men, and in our own material it approximates this incidence.

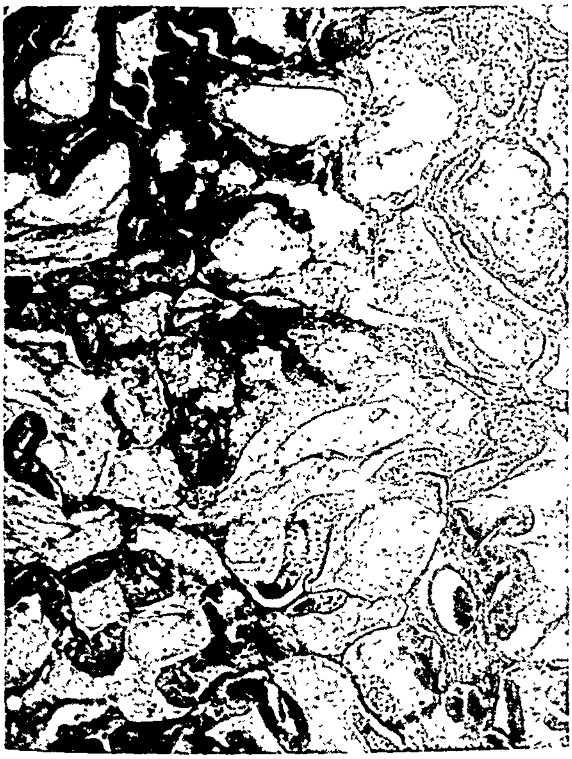

Fig. 5.—Lining of alveoli by high columnar cells with uniform nuclei, pale cytoplasm, and mucinous material in alveolar lumens.

Bronchiolar cell carcinoma presents a pathological, anatomic, and clinical entity, occurring with equal frequency in males and females. The clinical symptomatology is dominated by the expectoration of large amounts of mucoid sputum (daily, 100 cc. or more with admixture of streaks of blood), stubborn irritating cough, dyspnea, cyanosis, and night sweats. In the expectorated material, frequently one has the opportunity to demonstrate malignant cells. In this case, the characteristic expectoration of odorless, watery mucus was absent.

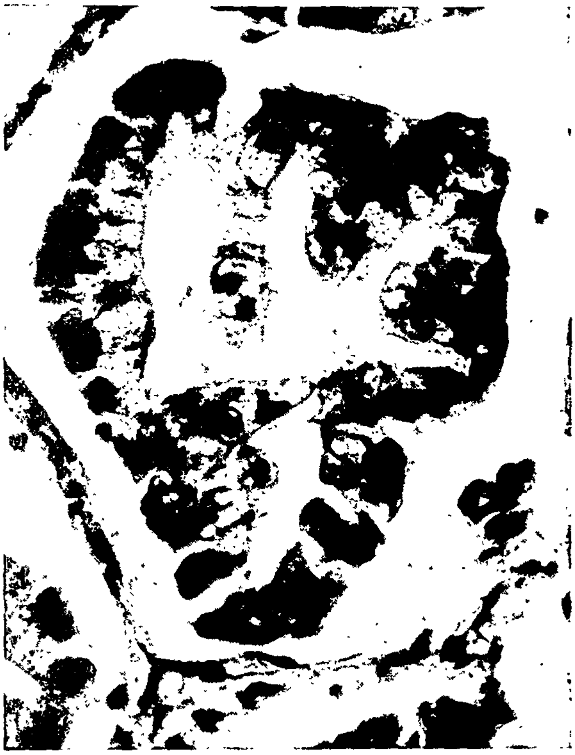

Fig. 6.—High-power view of lining of alveoli by high columnar epithelial cells with uniform nuclei, pale cytoplasm, and mucinous material in alveolar lumens.

Grossly, the tumor may be segmental (circumscribed) or diffuse, involving a large part of one or both lungs. The diffuse type of bronchiolar carcinoma (as in the case under discussion) may be of multicentric origin, or it may rapidly spread from a single focus by both bronchogenic and lymphogenic dissemination. The question of unicentric versus multicentric origin has important therapeutic implications. Doubtless, the importance of multicentric origin of this tumor has been overemphasized in the past. In all probability, bilateral involvement of the lung usually results from bronchogenic and lymphogenic spread from a rapidly metastasizing carcinoma of unicentric origin.

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THE JOURNAL
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STRENGTHENING THE SINEWS OF UNDERSTANDING

IN THIS issue (page 280) is published the address of the President of the American Medical Association, Dr. Gunnar Gundersen, delivered before the recent annual meeting of the Federation of State Medical Boards.

Dr. Gundersen has been widely quoted in the press as advocating that steps be taken in the immediate future to insure that physicians keep abreast of medical advances by requiring them to be reexamined periodically in order to retain their licenses to practice. A large response to the news references has come from physicians.

Dr. Gundersen was not certain which method was best to stimulate physicians to continue their education. He said: "This is a matter for careful study by all concerned." Dr. Gundersen's suggestion is not without precedent. In 1937, then A. M. A. President J. H. J. Upham said to the House of Delegates, "There is already a trend toward compulsory evidence of postgraduate improvement. . . . In several states there are laws requiring annual registration of physicians. . . . There is the possibility that the next step might be as a requirement for renewal of licensure evidence of familiarity with the developments in medicine by five or ten year periodic examinations."[1]

The American Medical Association was founded [illegible] 1847 because of the concern of leaders in the [illegible]fession with the low standards of medical education and of medical practice at that time. The Association ever since has steadfastly initiated and continued activities whose goal has been the elevation of standards of medical education at all levels to assure the highest attainable quality of medical care.

The profession has supported increasing programs of research—programs that have harvested an abundantly rich yield of new knowledge. Millions of dollars and the skills of thousands of physicians and other scientists pour into the research effort to develop new knowledge applicable in medicine to disease prevention and to the better diagnosis and therapeusis of disease.

Research is the means of producing new knowledge, but education is the means of its distribution. It is entirely appropriate that the medical profession be concerned with the distribution of new knowledge as thoroughly and as broadly as possible. Until advances in medicine are applied by physicians in patient care, they are ineffectual.

The use of the more significant advances requires a new synthesis of knowledge and a deepened understanding of disturbed biochemical and metabolic relationships. Such discoveries can be two-edged tools—capable of inflicting harm when used with insufficient understanding or of producing great benefit when used appropriately. Often the most significant advances are new insights into the basic processes of normal and disturbed body function, thus making medicine more rational and less empirical. Such discoveries must be fitted into the fabric of other related knowledge in each physician's mental armamentarium. Obviously initial education and training, no matter how excellent, is only a beginning of medical education, *not the end.*

The problem is how to maintain, in the light of ever-increasing knowledge, the superior competence with which doctors enter the profession. For the sake of the public it serves, how can the medical profession in active practice best be assisted to remain close to the summit of knowledge available?

As the profession long ago took the initiative in elevating the standards of education and fitness required to enter practice, now it is coming to grips with new challenges, among which is that of closing the gap between research and its application in practice. As the tempo of research accelerates, its effective dissemination becomes more urgent.

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[1] [illegible]am, J. H. J.: Advancement of Medical Education: President's [illegible] A. M. A. 108:2009-2011 (June 12) 1937.

ORGANIZATION SECTION

TELEVISION SERIES FOR THE ATLANTIC CITY MEETING

A series of four half-hour television programs summarizing top scientific events will be a feature of the American Medical Association's 108th Annual Meeting in Atlantic City. Originating at 5:30 p. m. Monday through Thursday from a special studio in Convention Hall, the American Medical Association's "Bulletin of the Air" will be seen in the Philadelphia–Atlantic City area over WFIL-TV, channel 6. On each telecast, meeting participants who made scientific "news" during the day will present capsule reports to the television audience. The programs—featuring Philadelphia newscaster Taylor Grant—will be designed to keep physicians informed of newsworthy events and at the same time show the general public what goes on at an A. M. A. meeting. Film recordings made of the "live" telecasts will be edited into motion picture "Highlights of the 108th Annual Session" for fall distribution to medical meetings throughout the country. Both the television programs and the filmed "Highlights" will be presented by the American Medical Association in cooperation with Merck, Sharp & Dohme. Serving as consultant in selection of program material is Dr. Stanley P. Reimann, Philadelphia, Chairman of the A. M. A.'s Council on Scientific Assembly.

GOLF TOURNAMENT DURING ATLANTIC CITY MEETING

The 43rd Annual Tournament of the American Medical Golfing Association will be held at the Seaview Country Club, Absecon, N. J., on June 8, 1959. The hours of teeing off are from 8 a. m. to 2 p. m. All male members of the A. M. A. are eligible for membership. The tournament fee of $25 will include green fees, luncheon, banquet, and prizes. New fellows pay an enrollment fee of $3 for lifetime membership. Private cars or taxis from Atlantic City are recommended as the best means of transportation. Arrangements may be made to pick up groups at their hotels in Atlantic City. Reservations and checks may be sent to Dr. Mario A. Castallo, 1621 Spruce St., Philadelphia 3.

GOVERNMENT SERVICES

ARMY

New Surgeon General.—Major Gen. Leonard D. Heaton has been named surgeon general to succeed Major Gen. Silas B. Hays whose term expired on April 30. General Heaton, who was commanding general of Walter Reed Army Medical Center, operated on the President for ileitis in 1956.

VETERANS ADMINISTRATION

Cord Injury Center.—One of the most complete hospital facilities ever designed for care of patients with spinal cord injuries is now in operation at the Veterans Administration hospital at Long Beach, Calif. This spinal cord injury center cares for 205 patients in the hospital and for 980 outpatients, and it has a separate section to handle visits of former patients who are working at various jobs in the area. The facilities for paraplegic and quadriplegic patients occupy the first floor and lower level of a new 296,000-sq. ft. expansion of the hospital, which replaced 20 temporary buildings on the site. The upper floors of the four-level expansion are used for general hospital activities.

Doctors' and other specialists' offices are located on one side of the first floor corridor of the central core, with treatment facilities and consultation rooms directly across the hall from each office. Patients' rooms and ward areas are located in the five wings of the first floor. Medical and vocational rehabilitation areas are in the lower level. The center has an exercise clinic, a cystoscopy clinic, a central bath area, a therapeutic pool, and specially designed brine tanks.

PUBLIC HEALTH SERVICE

Division of Water Pollution Control.—The Secretary of Health, Education, and Welfare has created a Division of Water Pollution Control. In the past two years, water pollution control activities have been carried out in the Water Supply and Water Pollution Control Branch of the Division of Sanitary Engineering Services. The new division will be in a better position to conduct the broad program of research, to accumulate necessary data on water supplies, conduct training, and administer enforcement activities and construction grants under the Water Pollution Control Act of 1956. Gordon E. McCallum, who is chief of the Water Supply and Water Pollution Control Branch, will be in charge of the new division.

MEDICAL NEWS

ALABAMA

Surgical Meeting in Huntsville.—The International College of Surgeons, Alabama Surgical Section, will meet May 21-22 at the Russel Erskine Hotel, Huntsville. Four panel discussions are planned with the following titles and moderators:

Obstetrics, Dr. Julian Hardy, Birmingham.
Orthopedic Surgery (Whiplash Injuries), Dr. Paul Shannon, Birmingham.
Gynecology, Dr. Gilbert F. Douglas Sr., Birmingham.
Abdominal Surgery, Dr. Claude J. Hunt, Kansas City, Mo.

At the banquet, May 21, 7:30 p. m., Dr. E. V. Caldwell, Executive first vice-president of the Alabama Section, will preside, and guest speaker will be Senator Lister Hill. For information, write Dr. E. V. Caldwell, 2515 Memorial Parkway, Huntsville, Ala.

ALASKA

New Journal for Alaska Physicians.—The first issue of *Alaska Medicine* was published for March. The new publication was accepted as the official journal of the Alaska State Medical Association at its annual meeting March 20. The journal will be published quarterly, in March, June, September, and December. As explained in the first volume editorial, although Alaska has scarcely 100 practicing physicians "there is a pressing need for communication among physicians in Alaska." The first issue is being distributed free of charge to all physicians in the state and to all medical school libraries and state medical societies in the United States. Suggestions and contributions are invited. Proposed for future issues are a clinicopathological conference, a column devoted to news and current activities, review articles, a section devoted to the history of medicine in Alaska, and a "Letters to the Editor" column. Dr. William O. Maddock, 423 D St., Anchorage, is the editor of the journal, and Dr. William J. Mills Jr., is the editor-in-chief.

ARKANSAS

Dr. Krantz Goes to Kansas.—Dr. Kermit E. Krantz, assistant professor of obstetrics and gynecology, University of Arkansas Medical Center, Little Rock, resigned to become professor and chairman of the department of obstetrics and gynecology, University of Kansas Medical Center, Kansas City. His new appointment is effective July 1. Dr. Krantz is the first University of Arkansas man to receive the Markle Foundation award "given to young educators and researchers who show unusual promise in the field of medical science." In 1950, he joined the University of Vermont faculty, where he was promoted to assistant professor in obstetrics and gynecology.

COLORADO

Dr. Altemeier Gives Clagett Lecture.—Dr. William A. Altemeier, chairman, department of surgery, University of Cincinnati, delivered the annual Clagett Lecture at the University of Colorado Medical Center, Denver, April 10, on "Studies in Septic Shock."

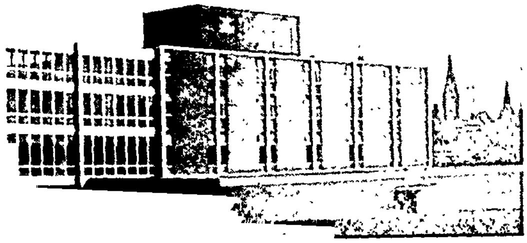
Establish Raymond R. Lanier Lectureship.—A lectureship in memory of the late Dr. Raymond R. Lanier of the faculty of the University of Colorado School of Medicine, Denver, was announced by Dean Robert J. Glaser. The first Lanier Lecture was given April 22 at the Medical Center by Dr. Louis H. Hempelmann, professor of experimental radiology, University of Rochester (N. Y.) School of Medicine, on "Malignant Disease in Irradiated Human Populations Exposed to Ionizing Radiation." Dr. Lanier was fatally injured last Nov. 24 near Holyoke when struck by a car during a hunting trip. He joined the university faculty in 1950 as head of the department of radiology, coming to Denver from the University of Chicago Clinics.

Nuclear Society Meeting.—On May 20 the Colorado Chapter of The Nuclear Society, a national organization of physicians, is holding its second annual regional meeting at the Denver Veterans Administration Hospital, sponsored by the University of Colorado. The meeting will occupy the entire day and will close with the annual dinner in the evening, when Col. Benjamin P. Blasingame, professor of astronautics at the Air Force Academy, will address the society on "Space Travel, Sense or Nonsense." The program will be presented by experts in nuclear medicine, recruited from the university, the Army, the Air Force, and from members of the local faculty of the Medical School and the V. A. staff. For information write Dr. Thad P. Sears, chief of Medical Service, Veterans Administration Hospital, 1055 Clermont St., Denver 20.

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education, and public health. Programs should be received at least three weeks before the date of meeting.

DISTRICT OF COLUMBIA

Building Dedications Mark Convocation.—The Georgetown University Medical Center was highlighted in ceremonies of the university's Spring Convocation March 19. In a morning ceremony two new buildings were dedicated—the 3-million-dollar Lawrence C. Gorman Diagnostic and Research Building and the $1,227,000 Kober-Cogan Dormitory for medical and dental students. Construction was begun on the Gorman Building in September, 1957. Constructed of brick, aluminum, and glass, the edifice has four stories and a basement. It is a memorial to the late Lawrence C. Gorman, S.J., president of Georgetown University from 1942 to 1949, under whose administration the University Hospital was erected. Dentistry and Nursing, as well as medicine, will be provided for in the new building. The 375-seat auditorium will include a projection booth with several interpreters' booths. Some of the departments to be established in the building are physical medicine, radioisotope unit, obstetrics and gynecology, outpatient department, psychiatry, pediatrics, practical nursing, dentistry, hematology and pathology laboratories, urology research laboratory, and surgical research metabolic laboratory. The Kober-Cogan Dormitory for medical and dental students stands in the university's Medical Center Area, to the east of the new Gorman Diagnostic and Research Building. Air-conditioned throughout, the dormitory houses 200 students in double rooms, has six stories and a basement, and honors the memory of Dr. George M. Kober, dean of the Georgetown School of Medicine from 1900 to 1929, and Dr. William N. Cogan, first dean of the School of Dentistry. Other activities of the convocation included the conferring of honorary doctor of science degrees on Clemens V. Rault, D.D.S., dean of the School of Dentistry; Dr. Alfred Blalock, Johns Hopkins University surgeon; and Dr. Fred R. Sanderson; professor emeritus of surgery at Georgetown. President Sean T. O'Kelley, of the Republic of Ireland, was presented a citation, and the Gorman Building ceremonies were closed with an address, "The Challenge of Medical Education Today," by Dr. Hugh H. Hussey, dean of the School of Medicine.



The Laurence C. Gorman Diagnostic and Research Building, Georgetown University Medical Center, Washington, D. C.

FLORIDA

Plan Alumni Organization.—First steps toward formation of an alumni association of the University of Miami School of Medicine were taken at a meeting held at the school in Coral Gables April 6. Representatives of the three classes already graduated by the school, together with members of the class of 1959, voted to set up organizational machinery as quickly as possible. Dr. Arthur Radin was named chairman pro tem for the new association. A committee was appointed to work with him in drafting by-laws, outlining a program, and setting up a schedule for future meetings.

Society News.—The newly elected officers of the North Florida Radiological Society for 1959 are Dr. Marvin H. Johnson, Jacksonville, president, and Dr. Paul A. Mori, 800 Miami Road, Jacksonville, secretary. The North Florida Radiological Society is composed of radiologists from North Florida and South Georgia. Meetings are held quarterly in Jacksonville.——The election of new officers by the Greater Miami Radiological Society, held Jan. 21, was as follows: president, Dr. Richard D. Shapiro, Miami Beach; vice-president, Dr. Andre S. Capi, Hollywood; and secretary-treasurer, Dr. George P. Daurelle, Jackson Memorial Hospital, Miami. The meetings are held on the third Wednesday of each month at 8 p. m. at Jackson Memorial Hospital.

County Society Combats Tetanus.—Dade County Medical Association learned through the county health department that tetanus occurs seven times more frequently in Dade County than in the rest of the country and kills over half its victims. Association members had already conducted a successful poliomyelitis inoculation drive. To avoid misunderstandings and assure cooperation, Dade County sent each doctor a letter explaining why and when the antitetanus drive was to begin and suggesting he keep Friday afternoons and Saturday mornings free for vaccinating working people without appointments. A cardboard plaque was enclosed to post in the reception room as a reminder to patients. Doctors were urged to participate regardless of specialty. Next, a news release was sent to all papers with a fact sheet containing information on tetanus for background stories. Seven spot announcements were furnished to radio and TV stations. Six talks were given over radio and five TV shows arranged by the association's PR Committee. Announcements were displayed on post office bulletin boards and sent to 278 clubs throughout the county. Thirty-one thousand shots were given during the month-long campaign, according to Executive Secretary John Hanni.

ILLINOIS

Meeting of Anesthesiologists.—On May 17 the Illinois Society of Anesthesiologists will hold its annual meeting at the Sherman Hotel, Chicago. The morning will be devoted to a panel discussion, "Fluothane," moderated by Dr. Richard E. Lyons, Chicago, and including the following speakers: Drs. John Abajian, Burlington, Vt., Charles B. Pittinger, Iowa City, C. R. Stephen, Durham, N. C., and Harold L. Harris, Evanston. The afternoon speaker will be Dr. Henry K. Beecher, Boston, who will discuss "Pain." For information write Dr. Clifford A. Baldwin Jr., 522 Maple Ave., Wilmette, Secretary-Treasurer.

Organize Ileostomy Group.—Under the guidance of Dr. Joseph B. Kirsner, department of medicine of the University of Chicago, an organization known as the Ileoptomists of Chicago has been organized for the purpose of helping patients in the proper care and adjustment to their ileostomies. Meetings are held regularly on the last Monday of each month at 6:30 p. m. at the Fabric Salesman's Club, 222 W. Adams St. The organization has announced that they welcome new members and are eager to cooperate with all who may wish to avail themselves of the help provided by this group. Any patient with an ileostomy interested in joining the organization may contact the secretary, Mrs. Lee Vance of 330 Ridge Road, Barrington, Ill. (telephone: DU 1-1496). The president is Mr. Mat Martel. His address is 27 S. Elm. St., Northlake, Ill. (telephone: FI 3-9041). Physicians interested in attending meetings and in the general purpose of the Ileoptomists should contact Dr. Kirsner at MU 4-6100, Ext. 5563.

Chicago

Dr. Breinin to Give Memorial Lecture.—The Edward Lorenzo Holmes Memorial Lecture, "Contributions of Electromyography to Strabismus," will be given by Dr. Goodwin M. Breinin, professor of research ophthalmology, New York University–Bellevue Medical Center, New York City, the evening of May 18 at a joint meeting of the Chicago Ophthalmological Society and the Institute of Medicine of Chicago at the Palmer House.

Dr. Dawson Wins Surgical Prize.—The 1959 Chicago Surgical Prize for Surgical Research has been awarded to Dr. Donald Dawson, working at the University of Chicago, for his paper, "Plasma Sterilization—An Experimental and Clinical Study on Selective Destruction of Bacterial Nucleoproteins Without Plasma Denaturation." This year's prize check of $500 was donated by Dr. Edwin M. Miller. Dr. Dawson's paper was presented at the meeting of the Chicago Surgical Society May 1.

LOUISIANA

Dr. Farber Awarded Cancer Grant.—A grant creating another American Cancer Society professorship in cancer research was made to Tulane University School of Medicine, New Orleans, to support the lifetime cancer research of Dr. Emmanuel Farber. Dr. Farber has been working in pathology and biochemistry since 1947, when he received an American Cancer Society research fellowship at the University of California. Later he received a society research fellowship at Hektoen Institute for Medical Research in Chicago. From 1951 to 1955, he was an American Cancer Society scholar in research at Tulane. Dr. Farber's is the seventh lifetime cancer research professorship established by the society. In creating Dr. Farber's research professorship, the society established a $100,000 trust fund as a guarantee and will pay the scientist's annual salary out of funds raised each year until the trust and accrued interest are sufficient to pay the remaining years of the grant. In the event cancer is brought under control and the society disbands, the $100,000 trust fund goes to the institution for continued medical research. If for some reason, Dr. Farber is unable to carry on his research work, the trust fund reverts to the society.

MASSACHUSETTS

Annual Meeting in Boston.—The 178th anniversary meeting of the Massachusetts Medical Society will be held May 19-21 at the Statler Hilton Hotel, Boston, under the presidency of Dr. Charles C. Lund. Three films will be shown: "Cineradiography as a Routine Diagnostic Study," "Open Heart Surgery," and "Recognition and Management of Respiratory Acidosis." The annual discourse will be given by Dr. Henry F. Howe, Cohasset, on "Procedures in Consultation and Referral." A mock trial on "A Motor Vehicle Liability Case with Attendant Medical Problems for Trial Before a Jury" is planned for May 19, 3:30 p. m., with Dr. James F. Kenney, as chairman. The Shattuck Lecture will be given by Dr. Robert E. Gross on "Open Heart Surgery." Section meetings and luncheons are planned, and the following panel discussions and moderators are arranged:

The Selective Use of Whole Blood, Blood Components and the Complications of Transfusion Therapy, Dr. Mark F. Lesses, Boston.

Surgical Sepsis, Dr. Carl W. Walter, Boston.

Medical Fees for the Insured Patient, Dr. David W. Wallwork, North Andover.

Guest speaker at the annual banquet May 20, 7 p. m., will be Gen. Alfred M. Gruenther, president, American National Red Cross. Scientific exhibits are arranged. The annual golf tournament will be held May 19 and an exhibition of works of art by society members, May 21. For informaton write Dr. Robert W. Buck, 22 The Fenway, Boston, Secretary.

MICHIGAN

Dr. Ruedemann Honored.—For his "noteworthy contributions to ophthalmology," Dr. Albert D. Ruedemann, chairman, department of ophthalmology, Wayne State University College of Medicine, Detroit, received the Lucien Howe award from the University of Buffalo April 9. The Howe award is given annually "to an outstanding ophthalmologist." Dr. Ruedemann is director of Kresge Eye Institute and also heads the departments of ophthalmology at Detroit Receiving and Harper hospitals. He organized and headed the department of ophthalmology at Cleveland Clinic for 23 years.

MINNESOTA

Annual Meeting in Duluth.—The Minnesota State Medical Association will hold its annual meeting May 25-27 at the Hotel Duluth, Duluth. Panel discussions and moderators will include the following: "*What's New in Cardiovascular Disease*," Dr. F. J. Hirschboeck, Duluth, and "Management of Strokes," Dr. Ina A. Brown, St. Paul. Special lectures are scheduled as follows:

Russell D. Carman Memorial Lecture, "Breakthroughs in the Solution of the Stroke Problem," Dr. James E. Lofstrom, Detroit.

Minnesota Academy of Ophthalmology and Otolaryngology Lecture, "Use of Steroids in Ocular Disease," Dr. John E. Harris, Minneapolis.

Arthur H. Sanford Lecture in Clinical Pathology, "A Clinical and Pathological Comparison of Chronic Glomerulonephritis and Malignant Hypertension," Dr. Elexious T. Bell, Minneapolis.

Minnesota Medical Foundation Lecture, "Streptococcal Infections and Their Complications," Dr. Lewis W. Wannamaker, Minneapolis.

Northwestern Pediatric Society Lecture, "Nutritional Requirements of the Neonate," Dr. Theodore C. Panos, Little Rock, Ark.

Symposiums will be held on breast cancer, massive gastrointestinal bleeding, urological problems, and staphylococcus infections. Round-table luncheons and technical exhibits are planned. A gold tournament, skeet and trap events, and boat trips are arranged. The annual banquet ($6) will be held May 26, 7 p. m., with Dr. E. W. Ziebarth, dean, summer session, University of Minnesota, speaking on "Russia Today." For information, write Mr. Harold W. Brunn, 496 Lowry Medical Arts Building, St. Paul 2, Executive-Secretary.

MISSOURI

Open Division of Child Psychiatry.—Washington University's new William Greenleaf Eliot division of child psychiatry was opened officially at an open house at the former Mission Free School, 369 N. Taylor Ave., St. Louis, April 12. The new division, housed in the three-story Mission Free School Building, will be directed by Dr. E. James Anthony, Blanche F. Ittleson professor of child psychiatry at the university. The new division was named for Dr. Eliot, who founded the Mission Free School in 1840. He later was a founder of Washington University and its first chancellor. The Eliot division of child psychiatry will be composed of two units: the Child Evaluation Clinic, for diagnosis and treatment of mentally retarded children, and the Community Child Guidance Clinic, for emotionally disturbed children.

MONTANA

Dr. Harris Named Secretary-Treasurer.—At the 12th interim session of the Montana Medical Association, April 3-4, the House of Delegates elected Dr. William E. S. Harris, Livingston, to the office of secretary-treasurer to succeed the late Dr. T. R. Vye. Dr. Harris has served as assistant secretary-treasurer from September, 1957, until the death of Dr. Vye, when he became acting secretary-treasurer. Dr. Jesse T. Schwidde, 1231 N. 29th St., Billings, was elected assistant secretary-treasurer. Dr. Schwidde and Dr. Harris will hold office until the next regular election, held during the annual meeting in September.

NEW YORK

Foreign Lecturer.—Sir Howard W. Florey, professor of pathology, Sir William Dunn School of Pathology, University of Oxford, England, presented a lecture, "The Properties of Endothelium," April 24 at the University of Buffalo School of Medicine.

Personal.—On Feb. 5, Dr. Harold A. Abramson, chief of the psychobiology section, Biological Laboratory, Cold Spring Harbor, at the invitation and under the auspices of the National Research Council of Canada, gave a public lecture in Ottawa on "Explorations in the Chemistry of Mental Processes."—Dr. Joseph F. Rudman has been appointed Health Commissioner for the Clinton County Department of Health, effective Feb. 1.

Allergy Meeting.—The New York Allergy Society will hold a meeting May 20 at the Beekman Tower Hotel, First Avenue and 49th Street, New York City. The scientific session will be: "Studies on Gamma Globulins: Clinical Significance for the Allergist," by Dr. Paul A. M. Gross, research fellow in pediatrics, Harvard Medical School, research fellow in medicine, Children's Hospital, Boston. The scientific session at 8:30 p. m. is to be preceded by a dinner at 7:15. For information, write Dr. Sheppard Siegal, Secretary, The New York Allergy Society, 2 E. 84th St., New York 23.

Meeting of Surgical Section.—The International College of Surgeons, New York Surgical Section, will meet May 28-31 at the Concord Hotel, Kiamesha Lake, N. Y. The chairman of the scientific program committee is Dr. Henry P. Leis Jr. A motion picture program is planned and the scientific program will have the following panel titles:

Newer Concepts in the Surgical Treatment of Peptic Ulcer.
The Treatment of Thyroid Disease.
Therapy of Advanced Breast Cancer.
Problems in Obstetrics and Gynecology.
The Management of Patients with Multiple Injuries.
Problems in Proctology.
Reconstructive Surgery.
Therapy of Intractable Pain.
Cardiopulmonary Emergencies of Interest to the General Surgeon.
Bioatomic Medicine and Civil Defense.

New York City

Dr. Wechsler Honored.—The Hebrew University of Jerusalem honored Dr. Israel S. Wechsler by establishing the Israel Wechsler Chair of Neurology at the Hebrew University–Hadassah Medical School.

Annual Lecture.—The 25th annual Edwin A. Jarecki Memorial Lecture was delivered at the Northern Division of the Albert Einstein Medical Center April 29 by Dr. Ludwik Gross, chief, Cancer Research Unit, Veterans Administration Hospital, Bronx, and associate scientist, Sloan–Kettering Institute, Memorial Center. His topic was "Viral Etiology of Mouse Leukemia; Its Possible Implications for the Problem of Cancer in General."

Dr. Rawson Receives Goiter Award.—The American Goiter Association presented its "Long and Meritorious Service Award for those of its members who had contributed significantly to the scientific and business affairs of the Association" to Dr. Rulon W. Rawson, professor of medicine, Sloan–Kettering Division, Cornell University Medical College, May 1. Dr. Rawson has served on the council of the association, has been chairman of many of its committees, and was president in 1955-1956. He worked in the Thyroid Clinic of the Massachusetts General Hospital, Boston, and served on the faculty of Harvard University. He directs the Division of Clinical Investigation of the Sloan–Kettering Institute.

Summer Course on Pharmaceutical Librarianship.—The Columbia University School of Library Service announced that during the 1959 summer session a special course on Pharmaceutical Literature and Librarianship will again be offered. The instructor will be Miss Winifred Sewell, librarian, Squibb Institute, New Brunswick, N. J. The course will provide a survey and evaluation of library materials in the field of pharmacy. Designed as advanced training for professional librarians now in service, the course has been scheduled to meet two hours daily from Monday through Friday for the first three weeks of the Summer Session, July 6-24, 7-8:40 p. m. Classes will meet at the College of Physicians and Surgeons at the Columbia University Medical Center. The fee for the course is $111, plus a registration fee of $10. Admission requires a bachelor's degree. Applications for admission, and information about related courses may be obtained from the School of Library Service, Columbia University, New York 27.

OREGON

Goiter Essay Award to Researcher.—The Van Meter prize of the American Goiter Association ($300), for the best work on the subject of goiter was awarded to Dr. Takashi Yamada for his "Studies on the Mechanism of Hypothalamic Control of Thyrotropin Secretion in the Rat." Dr. Takashi Yamada, a native of Japan, has M.D. and Ph.D. degrees from Gunma University. Since September, 1957, he has been a research fellow in the Division of Endocrinology at the University of Oregon Medical School, Portland, where he works under the direction of Dr. Monte A. Greer.

PENNSYLVANIA

Philadelphia

Annual Hospital Banquet.—The annual banquet of the Ex-Interne and Resident Association of the Hospital of the University of Pennsylvania will be held on Friday, June 12, at the Warwick Hotel, Philadelphia, beginning at 6 p. m. For information, write Dr. John W. Greene Jr., 104-6 Dulles Building, University Hospital, 3400 Spruce St., Philadelphia 4, Secretary.

Neurosurgical Meeting.—The first meeting of the newly organized Philadelphia Neurosurgical Society was held at the Jefferson Medical College May 15. Active members in this organization include all neurological surgeons from the State of Pennsylvania. Invited guests for this meeting were present from the District of Columbia, Maryland, Delaware, and New Jersey. Counselors and organizers of the society are Drs. Robert A. Groff, J. Rudolph Jaeger, Axel K. Olsen, and Michael Scott. Elected to officiate at this first meeting were president, Dr. Francis C. Grant; vice-president, Dr. Temple S. Fay; and secretary-treasurer, Dr. Frederick Murtagh.

Dr. Koelle to Head Pharmacology Department.—Dr. George B. Koelle, dean of the University of Pennsylvania Graduate School of Medicine, and chairman of the department of physiology and pharmacology of the Graduate School of Medicine, was elected chairman of the department of pharmacology of the university's School of Medicine, effective July 1. Dr. Koelle will succeed Dr. Carl F. Schmidt, who will retire from his departmental administrative duties after 28 years as professor and chairman. He will continue temporarily to serve

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as dean of the Graduate School of Medicine and will retain responsibility for teaching of pharmacology there while in his new Medical School position.

TENNESSEE

Dr. Rogers Receives Pathology Award.—Dr. Stanfield Rogers, director of Memorial Research Center, University of Tennessee, Knoxville, received the third annual award of the American Society for Experimental Pathology and a $1,000 honorarium contributed by Parke–Davis Co. in "recognition of his basic research on how tumors and cancers behave and grow." Dr. Rogers previously was professor of pathology at Duke University, assuming his present position early last year. He won the award for research done at Duke and the Rockefeller Institute for Medical Research, New York City.

WISCONSIN

Alumni Dinner in Atlantic City.—The University of Wisconsin Medical Alumni dinner will be held June 10, 6 p. m., in the Crystal Dining Room of the Sheraton–Ritz Hotel, Atlantic City. Since the alumni association is in the formative stages, all alumni are urged to attend.

GENERAL

Dr. Bishop Named World Medical Association Officer.—Dr. John M. Bishop, Bellevue, Wash., has been named deputy secretary-general of the World Medical Association. Dr. Bishop will assist Dr. Louis Bauer, World Medical Association secretary-general. Dr. J. Renaud Lemieux, Quebec, Canada, has been elected to fill a casual vacancy as president-elect.

Meeting on Mental Deficiency.—The American Association on Mental Deficiency will hold its 83rd annual meeting at the Hotel Schroeder, Milwaukee, May 19-23, under the presidency of Dr. George Tarjan. A symposium "Status of the A. A. M. D. Project—Past, Present and Future" will be held the morning of May 20. Section meetings will be held under the following titles: administration, education, medicine, social work, psychology, and rehabilitation. A joint education and psychology symposium is planned for the morning of May 22. Tours will be conducted the afternoon of May 21. A joint session with Wisconsin's ninth annual Institute on the Slow Learner is planned. Registration fee is $1 for members and $2 for nonmembers. Exhibits are scheduled.

History of Medicine Meeting in Cleveland.—The 32nd annual meeting of the American Association for the History of Medicine will be held May 21-23 in Cleveland with headquarters at the Cleveland Medical Library. A symposium on the heart will be moderated by Dr. Chauncey D. Leake, President, Ohio Academy of Medical History, May 22. The Garrison Lecture, "A View of Nineteenth Century Medical Historiography in the U. S. A.," will be given by Walton B. McDaniel II, Philadelphia. At the annual dinner, May 22, 7:30 p. m., with Dr. Owsei Temkin, Baltimore, president of the association, presiding. Dr. Saul Jarcho, New York City, will give "Hoaxes in Medical Literature." A roundtable discussion commemorating the centenary of Charles Darwin's "Origin of Species" will be moderated by Dr. Bruno Gebhard the morning of May 23. For information, write Dr. John B. Blake, c/o Smithsonian Institution, Washington 25, D. C.

Meeting of Gynecologists.—The American Gynecological Society will hold its 82nd annual session May 21-23 at The Homestead, Hot Springs, Va. The presidential address will be given at noon, May 22, by Dr. Lewis C. Scheffey, Philadelphia. Of the 14 papers scheduled for presentation, the following include invited authors:

Rupture of the Marginal Sinus and Abruption: Some Relationships, Dr. James H. Ferguson and Dr. Robert L. Hatton, Miami, Fla.
Demonstration of Trophoblast in the Circulating Blood During Pregnancy, Dr. Gordon W. Douglas, New York City.
The Relationship of the Squamo-Columnar Junction and the Endocervical Glands to the Site of Origin of Carcinoma of the Cervix, Dr. W. Norman Thornton Jr., Charlottesville, Va.
Radical Vulvectomy with Inguinal, Femoral and Iliac Node Dissection, Dr. Howard Ulfelder, Boston.

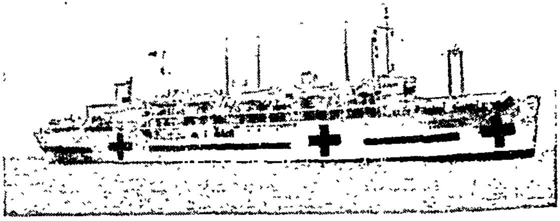
The annual dinner will be held the evening of May 22. For information, write Dr. Andrew A. Marchetti, Georgetown Hospital, Washington 7, D. C., Secretary.

Telecast on Hypertension.—A symposium on hypertension will be televised from the Cleveland Clinic on May 27 to 25 closed-circuit locations throughout the country at 9 p. m. EDT that evening. Physicians are invited to be present. The following will participate: Drs. Harriet P. Dustan, Cleveland Clinic; Edward D. Freis, Georgetown University School of Medicine; Irvine H. Page, Cleveland Clinic; Samuel Proger (moderator), Tufts University School of Medicine; Robert W. Wilkins, Boston University School of Medicine. They will consider the problems of several patients who will be presented to them. The problems will illustrate practical aspects of hypertension which the physician is likely to encounter in his day to day practice. This program is sponsored by the CIBA Pharmaceutical Products, Inc., under the title "CIBA TV Clinical Symposia." Cities where the symposium will be televised include: Albany, Atlanta, Baltimore, Boston, Brooklyn, Chicago, Cleveland, Denver, Detroit, Garden City, Kansas City, Los Angeles, Memphis, Miami, Newark, New York, Philadelphia, Pittsburgh, Portland, St. Louis, Salt Lake City, San Francisco, Seattle, Syracuse, and Washington, D. C. For information, write the Medical Radio and Television Institute, 130 E. 59th St., New York 22.

Prevalence of Poliomyelitis.—According to the National Office of Vital Statistics, the following number of reported cases of poliomyelitis occurred in the United States, its territories and possessions in the weeks ended as indicated:

Area	April 18, 1959		April 19, 1958
	Paralytic Type	Total Cases	Total
New England States			
Maine	..	..	..
New Hampshire	..	..	..
Vermont	..	..	..
Massachusetts	..	..	..
Rhode Island	..	..	..
Connecticut	..	..	..
Middle Atlantic States			
New York	1	2	1
New Jersey	..	..	..
Pennsylvania	..	..	..
East North Central States			
Ohio	..	1	..
Indiana	..	..	..
Illinois	..	..	..
Michigan	..	..	1
Wisconsin	1	1	..
West North Central States			
Minnesota	..	..	..
Iowa	..	..	..
Missouri	..	..	..
North Dakota	..	..	..
South Dakota	..	..	..
Nebraska	..	..	..
Kansas	..	..	..
South Atlantic States			
Delaware	..	..	..
Maryland	..	..	..
District of Columbia	..	..	..
Virginia	..	..	1
West Virginia	..	..	..
North Carolina	1	2	..
South Carolina	..	..	..
Georgia	1	1	..
Florida	6	6	1
East South Central States			
Kentucky	..	..	..
Tennessee	..	..	..
Alabama	..	..	1
Mississippi	..	1	..
West South Central States			
Arkansas	..	..	1
Louisiana	..	..	..
Oklahoma	..	..	..
Texas	2	2	1
Mountain States			
Montana	..	..	..
Idaho	..	..	..
Wyoming	..	..	..
Colorado	..	..	1
New Mexico	..	..	..
Arizona	1	1	..
Utah	..	1	..
Nevada	..	..	..
Pacific States			
Washington	..	..	2
Oregon	..	..	..
California	..	..	2
Alaska	..	..	..
Hawaii	..	..	..
Puerto Rico	..	..	2
Total	13	18	14

Hospital Ship for Overseas Health Aid.—Project HOPE is the principal activity carried out by the People-to-People Health Foundation, Inc., and involves chartering the fully equipped Navy hospital ship, Consolation, and using it as a privately supported, privately operated medical and medical training center in friendly nations overseas. The HOPE Project (HOPE stands for Health Opportunity for People Everywhere) will depend on donations from individuals, corporations, and foundations. The American Medical Association and several drug manufacturers have made contributions in advance of any public request for funds in order to get the project organized. In addition, the drug manufacturers have indicated that they will supply the drug needs of the project. President Eisenhower announced that the Navy will release the ship for charter as soon as financial arrangements for operations are completed. The scheduled sailing date is Sept. 15, from San Francisco. During the first year of operation, the ship will visit countries in Southeast Asia. It will be operated for the foundation by the American President Lines at cost to them and without any fee. The HOPE project will go where it is invited by the medical profession of a country. The Consolation has about 800 beds but will be used primarily for teaching. A permanent party of 20 doctors, including two dentists, and 15 nurses in addition to required technical personnel is planned. The People-to-People Health Foundation, Inc., is a private, independent nonprofit corporation originally sponsored by President Eisenhower. Its program is organized of 41 different committees of private citizens with the objective of including as many phases of our life and culture as would be meaningful. There are committees in fine arts, sports, and the medical and health professions. The committees have taken action to incorporate to give permanency to their work and tax-deductible status to the gifts they receive. Dr. William B. Walsh is the president of Project HOPE, and the address of the project is P. O. Box 9808, Washingto 15, D. C.



The USS Consolation (Official United States Navy Photograph).

CORRECTION

Meeting on Sterility in Atlantic City.—Under this title in Medical News in THE JOURNAL, March 28, page 1494, the item should have stated that Dr. Edward C. Reifenstein Jr., New Brunswick, N. J. (listed as 1959 president), was chairman of the program committee with Dr. Sheldon Payne, Los Angeles, as 1959 president; the presidential address (given as "Nolle Nodere") should have been "Nolle Nocere"; and the Simmons Memorial addressee (given as Dr. Alan N. B. Grant) should read Dr. Alan Grant, Sydney, Australia.

EXAMINATIONS AND LICENSURE

NATIONAL BOARD OF MEDICAL EXAMINERS

National Board of Medical Examiners: Various Centers: Parts I and II, June 16-17; Part I only, Sept. 9-10. Examinations must be received at least six weeks in advance of a specific examination date. Examining centers established after close of registration. Exec. Sec., Dr. John P. Hubbard, 133 South 36th St., Philadelphia 4.

EDUCATIONAL COUNCIL FOR FOREIGN MEDICAL GRADUATES, INC.

Educational Council for Foreign Medical Graduates: Stations around the world, Sept. 22. Final date for filing applications is June 22. Exec. Director, Dr. Dean F. Smiley, 1710 Orrington Ave., Evanston, Ill.

BOARDS OF MEDICAL EXAMINERS

Alabama: *Written*. Montgomery, June 16-18. Sec., Dr. D. G. Gill, State Office Bldg., Montgomery 4.

Alaska:* On application in Anchorage or Fairbanks. Sec., Dr. W. M. Whitehead, 172 South Franklin St., Juneau.

Arizona:* *Reciprocity*. Phoenix, July 15-17. Exec. Sec., Mr. Robert Carpenter, 826 Security Bldg., Phoenix.

Arkansas:* *Examination and Reciprocity*. Little Rock, June 11-12. Sec., Dr. Joe Verser, Harrisburg.

California: *Written*. San Francisco, June 15-18; Los Angeles, Aug. 17-20; Sacramento, October 19-22. *Oral*. San Francisco, Juune 13; Los Angeles, August 15; San Francisco, November 14. *Oral and Clinical*. San Francisco, June 14; Los Angeles, August 16; San Francisco, Nov. 15. Sec., Dr. Louis E. Jones, Room 536, 1020 N Street, Sacramento.

Colorado:* *Examination*. Denver, June 9-10. *Reciprocity*. Denver, July 14. Sec., Dr. John B. Farley, 712 Republic Bldg., Denver 2.

Connecticut:* *Homeopathic Board. Reciprocity*. Derby, June 9. Sec., Dr. Donald A. Davis, 38 Elizabeth St., Derby. *Regular Board. Examination*. Hartford, July 14-16. Sec., Dr. Staley B. Weld, 160 St. Ronan St., New Haven.

Delaware: *Examination*. Dover, July 14-16. *Endorsement*. Dover, July 23. Sec., Dr. Joseph S. McDaniel, Professional Bldg., Dover.

District of Columbia:* *Written*. Washington, June 8-9. Final date for filing application is May 1. Sec., Dr. Daniel Leo Finucane, 1740 Massachusetts Ave., N. W., Washington.

Florida:* *Examination*. Miami Beach, June 21-23. Sec., Dr. Homer L. Pearson, 901 N.W. 17th St., Miami 36.

Georgia: *Examination and Reciprocity*. Atlanta, June 10-11. Sec., Mr. C. L. Clifton, 224 State Capitol, Atlanta 3.

Guam: *Subject to Call*. Act. Sec., Dr. F. L. Conklin, Agana.

Hawaii: *Written*. Honolulu, July 13-14. Sec., Dr. I. L. Tilden, 1020 Kapiolani St., Honolulu.

Idaho: *Examination and Endorsement*. Boise, July 13. Exec. Sec., Mr. Armand L. Bird, 364 Sonna Bldg., Boise.

Illinois: *Examination*. Chicago, July 7-10. *Reciprocity*. Chicago, July 10. Supt. of Registration, Mr. Frederic B. Selcke, Capitol Building, Springfield.

Indiana: *Examination*. Indianapolis, June 17-19. Exec. Sec., Miss Ruth V. Kirk, 538 K. of P. Bldg., Indianapolis.

Iowa:* *Examination*. Iowa City, June 15-17. Exec. Sec., Mr. Ronald V. Saf, State Office Bldg., Des Moines 19.

Kansas:* *Examination and Endorsement*. Kansas City, June. Sec., Dr. F. J. Nash, New Brotherhood Bldg., Kansas City.

Kentucky: *Examination*. Louisville, June 8-10. Sec., Dr. Russell E. Teague, 620 South Third St., Louisville 2.

Louisiana: *Examination. and Reciprocity*. New Orleans, June 4-6. Sec., Dr. Edwin H. Lawson, 930 Hibernia Bank Bldg., New Orleans.

Maine: *Examination and Reciprocity*. Augusta, July 14-16. Sec., Dr. Stephen A. Cobb, Sanford.

Maryland: *Examination*. Baltimore, June 10-13. Sec., Dr. Frank K. Morris, 1211 Cathedral St., Baltimore 1.

Michigan:* *Examination*. Ann Arbor and Detroit, June 8-10. Sec., Dr. E. C. Swanson, 118 Stevens T. Mason Bldg., West Michigan Ave., Lansing 8.

Mississippi: *Examination and Reciprocity*. Jackson, June 22-24. Sec., Dr. A. L. Gray, Old Capitol, Jackson 13.

Missouri: *Examination*. St. Louis, May 29-30. Exac. Sec., Mr. John A. Hailey, Box 4, State Capitol Bldg., Jefferson City.

Montana: *Examination and Reciprocity*. Helena, Oct. 6. Sec., Dr. Thomas L. Hawkins, 555 Fuller Ave., Helena.

Nebraska:* *Examination*. Omaha, June 15-17. Director, Mr. Husted K. Watson, Room 1009, State Capitol Bldg., Lincoln 9.

Nevada: *Examination and Reciprocity*. Reno, June 2. Sec., Dr. George H. Ross, 112 North Curry St., Carson City.

New Hampshire: *Examination and Reciprocity*. Concord, Sept. 9-12. Sec., Dr. Edward W. Colby, 107 State House, Concord.

New Jersey: *Examination*. Trenton, June 16-18. Sec., Dr. Royal A. Schaaf, 28 West State St., Trenton 8.

New Mexico:* *Examination and Reciprocity*. Santa Fe, May 18-19. Sec., Dr. R. C. Derbyshire, 227 East Palace Ave., Santa Fe.

New York: *Examination*. New York, Rochester, Syracuse, Buffalo and Albany, June 23-26. Sec., Dr. Stiles D. Ezell, 23 S. Pearl St., Albany.

North Carolina: *Written. Examination and Endorsement*. Raleigh, June 15-18. Sec., Dr. Joseph J. Combs, 716 Professional Bldg., Raleigh.

North Dakota: *Examination and Reciprocity*. Grand Forks, July 8-11. Sec., Dr. C. J. Glaspel, Box 228, Grafton.

Ohio: *Examination*. Columbus, June 18-20. Sec., Dr. H. M. Platter, 21 West Broad St., Columbus 15.

Oklahoma:* *Examination*. Oklahoma City, June 2-3. Exec. Sec., Mrs. E. L. Haidek, 813 Braniff Bldg., Oklahoma City.

Pennsylvania: *Examination and Endorsement*. Philadelphia and Pittsburgh, July 1-3. Sec., Mrs. Margaret G. Steiner, Box 911 Harrisburg.

Puerto Rico: *Examination*. San Juan, Sept. 8. Sec., Dr. Joaquin Mercado Cruz, Box 9156, Santurce.

Rhode Island:* *Examination and Endorsement*. Providence, July 2-3. Administrator, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

South Carolina: *Examination*. Columbia, June 23-24. Sec., Dr. H. E. Jervey, Jr., 1829 Blanding St., Columbia.

South Dakota:* *Examination*. Sioux Falls, Aug. 25-26. Exec. Sec., Mr. John C. Foster, 300 First National Bank Bldg., Sioux Falls.

Tennessee:* *Examination*. Nashville, June 2-3 and Memphis, June 17-18. Sec., Dr. H. W. Qualls, 1635 Exchange Bldg., Memphis 3.

Texas:* *Examination and Reciprocity*. Fort Worth, June 22-24. Sec., Dr. M. H. Crabb, 1714 Medical Arts Bldg., Fort Worth 2.

Utah: *Examination and Reciprocity*. Salt Lake City, July 8-10. Dir., Mr. Frank E. Lees, 324 State Capitol Bldg., Salt Lake City 1.

Vermont: *Examination*. Burlington, June 18-20. Sec., Dr. F. J. Lawliss, Richford.

Virginia: *Examination*. Richmond, June 18-20. *Endorsement*. Richmond, June 17. Address: Board of Medical Examiners, 631 First St., S. W., Roanoke.

Virgin Islands: *Examination*. Charlotte Amalie, St. Thomas, June 10. Chairman, Dr. Melvin H. Evans, Christiansted, St. Croix.

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*Basic Science Certificate required.

DEATHS

Akers, Waller C. Ⓜ Stuart, Va.; University College of Medicine, Richmond, 1912; served as president of the Patrick County Medical Society; formerly mayor of the town of Stuart; president of the Patrick County Bank; past-president of the Stuart Rotary Club, of which he was a charter member; served on the medical examiners board during World War I and was awarded a selective service medal for his medical service during World War II; owner of the Stuart Hospital; died Feb. 27, aged 75.

Alford, Warren Grady Ⓜ Memphis, Tenn.; University of Tennessee College of Medicine, Memphis, 1914; served in France during World War I; died in the Kennedy General Hospital March 1, aged 69.

Allen, Charles F., Middleton, Wis.; Milwaukee Medical College, 1900; served two terms as village president; since 1915 president of the Bank of Middleton; died in St. Mary's Hospital, Madison, Feb. 17, aged 85.

Anderson, Joel Ⓜ North Platte, Neb.; John A. Creighton Medical College, Omaha, 1915; served as county physician and member of the city council; past-president of the Kiwanis Club; on the staff of the St. Mary and North Platte Memorial hospitals; died Feb. 18, aged 74.

Archambault, Joseph Arthur, Fall River, Mass.; School of Medicine and Surgery of Montreal, Que., Canada, 1901; died in Notre Dame de l'Esperance Hospital, Montreal, Que., Feb. 2, aged 83.

Barrett, Gilbert Michael Ⓜ San Francisco; born in Elizabeth, Ill., in 1869; Bellevue Hospital Medical College, New York City, 1895; fellow of the American College of Surgeons; veteran of World War I; in 1918 became chief surgeon for the shipbuilding division of Bethlehem Steel Company and was with them in this capacity until 1954; medical director for the San Francisco District, General Electric Company, for the period from 1917 to 1956; associated with St. Francis Memorial Hospital and the St. Luke's Hospital, where in December, 1956, he was honored and placed on the emeritus staff; died in St. Luke's Hospital Jan. 10, aged 89.

Beckary, Albert M. Ⓜ Indian Lake, N. Y.; Cornell University Medical College, New York City, 1905; died Jan. 21, aged 81.

Berry, John William Ⓜ Albuquerque, N. M.; University of Colorado School of Medicine, Denver, 1939; veteran of World War II; specialist certified by the American Board of Internal Medicine; fellow of the American College of Physicians; member of the American Trudeau Society; at one time on the faculty of his alma mater; chief of chest service, Veterans Administration Hospital; associate editor, section on pulmonary diseases, "Cyclopedia of Medicine, Surgery, and the Specialties"; died Feb. 23, aged 44.

Blechman, Abram Joel Ⓜ Baltimore; Medical College of Virginia, Richmond, 1926; member of the American Academy of General Practice; associated with the Sinai Hospital; died Nov. 8, aged 58.

Blickenstaff, Augustus J. Ⓜ Peoria, Ill.; State College of Physicians and Surgeons, Indianapolis, 1907; member of the American Academy of Ophthalmology and Otolaryngology; on the staff of the Proctor Hospital; died in St. Petersburg, Fla., Feb. 11, aged 86.

Bousfield, Cyril Eustace, Woolwich, Maine; Pennsylvania Medical School (Medical Department of St. John's University) Shanghai, China, 1931; served as a medical missionary in China; died March 1, aged 88.

Bower, Lester Edward Ⓜ Chicago; Northwestern University Medical School, Chicago, 1914; clinical assistant professor emeritus of pediatrics at the University of Illinois College of Medicine; specialist certified by the American Board of Pediatrics; past-president of the staffs of the Illinois Masonic and Martha Washington hospitals; served on the staffs of the Cook County and Lutheran Deaconess hospitals; died in the Alexian Brothers Hospital March 3, aged 70.

Bowman, William Frederick, Canton, Mo.; Keokuk (Iowa) Medical College, College of Physicians and Surgeons, 1900; veteran of World War I; died Feb. 8, aged 89.

Boyd, Clarence Elbert Ⓜ Lakeland, Fla.; Hospital College of Medicine, Louisville, 1902; veteran of World War I; died in the Morrell Hospital Feb. 2, aged 79.

Boyle, Jeremiah Joseph, Cambridge, Mass.; Harvard Medical School, Boston, 1905; died in the Cambridge City Hospital Feb. 11, aged 81.

Britton, Harry Albert Ⓜ Ithaca, N. Y.; Medico-Chirurgical College of Philadelphia, 1913; served on the faculty of Cornell University; died in the Tompkins County Hospital Feb. 17, aged 77.

Ⓜ Indicates Member of the American Medical Association.

Brown, Greenberry Bedford Ⓜ Georgetown, Ky.; Johns Hopkins University School of Medicine, Baltimore, 1917; veteran of World War I; honorary member of staffs of St. Joseph's and Good Samaritan hospitals in Lexington, and the John Graves Ford Memorial Hospital; died in St. Louis Feb. 18, aged 66.

Brown, Wayne Ebert Ⓜ Clyde, Ohio; Western Reserve University School of Medicine, Cleveland, 1932; veteran of World War II; served as county coroner; on the staff of the Bellevue (Ohio) Hospital, where he died Feb. 20, aged 53.

Burgeson, Samuel D. Jr., Los Angeles; College of Medical Evangelists, Loma Linda and Los Angeles, 1929; at one time police and fire department surgeon; on the staff of the Lincoln Hospital; died Feb. 24, aged 58.

Chaimson, Harry, Boston; St. Louis College of Physicians and Surgeons, 1921; died in Milton, Mass., Jan. 4, aged 66.

Clements, William R., Woodbury, N. J.; Medical College of Virginia, Richmond, 1894; died in Trenton Dec. 31, aged 86.

Coffee, Percy Elmos, Davenport, Iowa; the Hahnemann Medical College and Hospital, Chicago, 1903; president and founder of the Elmo Company; died in St. Luke's Hospital Feb. 6, aged 77.

Collins, Thomas F. Ⓜ Adamsville, Pa.; Eclectic Medical Institute, Cincinnati, 1904; died in the Meadville (Pa.) City Hospital Feb. 13, aged 80.

Combes, Abbott Carson Jr., Sheffield, Mass.; Columbia University College of Physicians and Surgeons, New York City, 1911; veteran of World War I; served as a member of his local draft board for the duration of World War II, and also as examining physician, New York City; division surgeon for the Long Island Railroad; on the staff of the Flushing (N. Y.) Hospital; at one time president of the Combes' Sanitarium in Corona; died in the Charlotte Hungerford Hospital, Torrington, Conn., Feb. 27, aged 74.

Dickson, George LeGrande, Manning, S. C.; Medical College of South Carolina, Charleston, 1895; also a druggist; died in the Clarendon Memorial Hospital Feb. 19, aged 90.

Dorr, Addison Michael, Wauwatosa, Wis.; Northwestern University Medical School, Chicago, 1912; past-president of the Milwaukee Roentgen Ray Society; served on the staffs of the Veterans Administration Center in Wood, Evangelical Deaconess Hospital in Milwaukee, St. Joseph's Hospital, Beaver Dam, and St. Mary's Hospital in Columbus; died in St. Joseph's Hospital in Milwaukee Feb. 24, aged 72.

Douglas, Edmund Turner Ⓜ Hillsboro, Ill.; St. Louis University School of Medicine, 1912; on the staff of Hillsboro Hospital; president of the Montgomery County National Bank; died in St. Luke's Hospital, St. Louis, Feb. 9, aged 69.

Dowd, Thomas Francis Ⓜ Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1935; past-president of the Philadelphia Academy of General Practice; on the staff of the St. Mary's Hospital, Nazareth, and St. Joseph's hospitals; director of the Pennsylvania Blue Shield; veteran of World War II; team physician for the Philadelphia Eagles of the National Football League; in 1939-1940 team physician for the Chicago Cubs; died Feb. 23, aged 53.

Drummond, Alvin Cash Ⓜ New York City; born in Grant, Mich., Feb. 27, 1903; Columbia University College of Physicians and Surgeons, New York City, 1932; specialist certified by the American Board of Urology; certified by the National Board of Medical Examiners; member of the American Urological Association; fellow of the American College of Surgeons, American Academy of Compensation Medicine, International College of Surgeons, and the American Geriatrics Society; member of the New York Academy of Medicine; assistant clinical professor of urology, New York University College of Medicine; associated with University Hospital (New York University–Bellevue Medical Center), Gouverneur Hospital, and Doctors Hospital, where he died Dec. 22, aged 55.

Fenton, Kevin Joseph Ⓜ Lieut., U. S. Navy, Akron, Ohio; Western Reserve University School of Medicine, Cleveland, 1956; interned at the Children's Medical Center in Boston; stationed at the U. S. Naval Radiological Defense Laboratory in San Francisco; died in San Francisco Feb. 26, aged 28.

Fibush, Arthur, Oakland, Calif.; Oakland College of Medicine and Surgery, 1916; from 1920 to 1925 health officer of the city of Piedmont; during World War II served as a medical examiner for an induction board; died in the Samuel Merritt Hospital, Feb. 22, aged 68.

Flesche, Bernard Alton Ⓜ Lake City, Minn.; born in Walnut Grove, July 17, 1904; University of Minnesota Medical School, Minneapolis, 1934; member of the American Academy of General Practice; past-president and secretary-treasurer of the Wabasha County Medical Society; past-president of the Southeastern Minnesota Academy of General Practice; from 1956 to 1958 member of the executive board of the Minnesota Academy of General Practice and in 1954 received its award for "Top Flight General Practitioner"; member of the Minnesota Public Health Conference, World Health Organization, Association of Military Surgeons of the United States, Minnesota Medical Foundation, and Phi Rho Sigma fraternity; past-president of Lake City Chamber of Commerce; treasurer of the Wabasha County Historical Society; veteran of World War II; a veteran Boy Scout leader and received the Silver Beaver Award for "long and distinguished service to boyhood" in 1954; died in St. Mary's Hospital, Rochester, Minn., Feb. 12, aged 54.

Floyd, George Matthew Ⓜ Hawthorne, Fla.; Atlanta College of Physicians and Surgeons, 1909; died in the Alachua General Hospital, Gainesville, Feb. 17, aged 77.

Fraley, Hugh B., Ashland, Ky.; Louisville (Ky.) Medical College, 1895; died Feb. 20, aged 93.

Friday, Clarence Claude Bausella Ⓜ Seguin, Texas; Howard University College of Medicine, Washington, D. C., 1926; served as president twice and as secretary for 23 years for the Southwest Texas District Medical, Dental, and Pharmaceutical Association, which presented him a plaque for "25 years of faithful and distinguished service"; formerly president and executive secretary of the Lone Star State Medical Association; on the staff of the Seguin Hospital; died Dec. 26, aged 62.

Gethner, Max Peter Ⓜ Chicago; University of Illinois College of Medicine, Chicago, 1911; specialist certified by the American Board of Internal Medicine; served on the faculty of Rush Medical College; associated with Lutheran Deaconess Home and Hospital, Norwegian American Hospital, Walther Memorial Hospital, and Columbus Hospital; staff physician for the International Ladies Garment Workers Union; on the courtesy staff of Michael Reese Hospital, where he died March 4, aged 71.

Glanville, William Earl, Southampton, N. Y.; Cornell University Medical College, New York City, 1911; served in the U. S. Public Health Service and the U. S. Navy; attending physician for the public schools; for many years on the staff of the Southampton Hospital, where he died Jan. 13, aged 70.

Green, Lafayette, East St. Louis, Ill.; St. Louis College of Physicians and Surgeons, 1910; chief deputy St. Clair County coroner from 1920 to 1928; died in Washington Park Jan. 22, aged 70.

Harris, Claib Bosworth Ⓜ Garnett, Kan.; University Medical College of Kansas City, Mo., 1906; served as county health officer, county coroner, and for a time as city health officer in Garnett; associated with the Anderson County Hospital in Garnett and the Trinity Lutheran Hospital in Kansas City, Mo., where he died Feb. 4, aged 82.

Hart, James Finlay, New York City; Syracuse University College of Medicine, 1911; past-president of the Bronx County Medical Society and the New York Diabetes Association; a life member of the New York Academy of Medicine; served as adjunct professor of medicine at the New York Polyclinic Medical School and Hospital and associate clincal professor of medicine at the New York Medical College, Flower and Fifth Avenue Hospitals; associated with the Midtown Hospital; died in the New York Polyclinic Medical School and Hospital Feb. 24, aged 73.

Hopkins, Frank Ⓜ Hot Springs, Va.; University of Pennsylvania Department of Medicine, Philadelphia, 1895; died Feb. 28, aged 86.

Hudnall, Harry Gilman Ⓜ Roanoke, Va.; University of Virginia Department of Medicine, Charlottesville, 1931; veteran of World War II; associated with the Veterans Administration Hospital; past-president of the Alleghany, Bath Counties Medical Society; died in the Jefferson Hospital Feb. 20, aged 52.

Lemus, Leopoldo, San Antonio, Texas; Escuela Médico Militar, México, D. F., 1923; died in St. Benedict Hospital Feb. 9, aged 60.

Leonard, Edwin Jr., North Bergen, N. J.; Harvard Medical School, Boston, 1898; died in the Christ Hospital, Jersey City, Dec. 11, aged 87.

Llewellyn, John Rees, Salt Lake City, Utah; Rush Medical College, Chicago, 1916; served as a member of the city board of health; during World War II served on the draft appeal board; associated with the Latter Day Saints Hospital; died Feb. 7, aged 72.

Lyman, Alexander Victor, New York City; Columbia University College of Physicians and Surgeons, New York City, 1926; certified by the National Board of Medical Examiners; served overseas during World War I; on the staff of the Roosevelt Hospital; died Feb. 27, aged 62.

McCarthy, Edwin Eugene Ⓜ Sarasota, Fla.; Syracuse University College of Medicine, 1937; formerly practiced in Auburn, N. Y., where he was on the staffs of the Mercy and Auburn Memorial hospitals, and the Auburn State Prison; died Feb. 16, aged 47.

McFaddin, James Thomas Ⓜ Johnson City, Tenn.; Loyola University School of Medicine, Chicago, 1916; member of the American Society of Anesthesiologists and the American Academy of General Practice; served as city commissioner and city physician and was deputy coroner of Washington County; on the staff of the Memorial Hospital; died Feb. 3, aged 66.

McNary, Wilbert Francis Ⓜ East St. Louis, Ill.; Barnes Medical College, St. Louis, 1909; past-president of the St. Clair County Medical Society; veteran of World War I; on the staff of St. Mary's Hospital, where he died Feb. 1, aged 77.

Mann, Henry L., Holliston, Mass.; Boston University School of Medicine, 1903; served during World War I; assistant medical director for the Equitable Life Assurance Society of America; died in the Framingham (Mass.) Union Hospital Feb. 15, aged 81.

Martinez-Carranza, Enrique, Brownsville, Texas; Loyola University School of Medicine, Chicago, 1917; died in Monterrey, M. L., Mexico, Dec. 4, aged 66.

Mathews, Robert William Ⓜ Greensboro, N. C.; Emory University School of Medicine, Atlanta, 1932; associated with the Moses H. Cone Memorial Hospital and the Wesley Long Community Hospital; died Feb. 6, aged 50.

Mead, Chester Ira Ⓜ Bakersfield, Calif.; State University of Iowa College of Medicine, Iowa City, 1931; specialist certified by the American Board of Pediatrics; member of the American Academy of Pediatrics; past-president of the Kern County Medical Society; on the staff of the Mercy Hospital; past-president of the Bakersfield Rotary Club; died Feb. 11, aged 58.

Middleton, Daniel Spencer Ⓜ Rising Fawn, Ga.; Medical Department of Grant University, Chattanooga, Tenn., 1894; physician for the Alabama Great Southern Railway; served in both the Georgia House and Senate; died Feb. 8, aged 88.

Miller, Benjamin Ⓜ Baltimore; University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore, 1924; member of the American Academy of General Practice; died Dec. 24, aged 58.

Miller, Nora Rice, Denver; University of Colorado School of Medicine, Denver, 1908; died Feb. 9, aged 90.

Muncie, Henry L. Ⓜ Brazil, Ind.; Medical College of Indiana, Indianapolis, 1905; died Feb. 14, aged 79.

Muniz, Rafael Rufino Ⓜ New York City; Medical College of Virginia, Richmond, 1932; specialist certified by the American Board of Pediatrics; member of the American Academy of Pediatrics; on the staff of the University Hospital; died Dec. 1, aged, 55.

Nattrass, Robert B., Bloomfield, W. Va., New York Homeopathic Medical College and Hospital, New York City, 1905; died Feb. 3, aged 76.

Nelson, Aaron Archer, Allendale, N. J.; University and Bellevue Hospital Medical College, New York City, 1899; veteran of World War I; formerly on the staff of St. Francis Hospital in Jersey City; died in the Valley Hospital, Ridgewood, Feb. 1, aged 80.

Newell, John Oliver, Franklinton, N. C.; College of Physicians and Surgeons, Baltimore, 1910; past-president of the Franklin County Medical Society; died Feb. 18, aged 82.

Nova, Jules Mark Ⓜ Freeport, N. Y.; Long Island College Hospital, Brooklyn, 1902; specialist certified by the American Board of Ophthalmology; on the staff of the Brooklyn Eye and Ear Hospital; died in the Nassau Hospital in Mineola Dec. 12, aged 79.

Orlick, Abraham P., Miami Beach, Fla.; Long Island College Hospital, Brooklyn, 1922; formerly practiced in Brooklyn, where he was on the staffs of the Unity, Crown Heights, and Brooklyn Women's hospitals; died in the Miami Heart Institute Feb. 13, aged 70.

Peberdy, Wilfred Montague Ⓜ Captain, U. S. Navy, retired, Orange, Conn.; Yale University School of Medicine, New Haven, 1917; entered the U. S. Navy in 1917 and retired Dec. 1, 1946; veteran of World Wars I and II; died in the Veterans Administration Hospital in West Haven Feb. 13, aged 67.

Piggott, John Burr Ⓜ Washington, D. C.; University of Maryland School of Medicine, Baltimore, 1907; veteran of World War I; associated with the Eastern Dispensary and Casualty Hospital and the Central Dispensary and Emergency Hospital; at one time on the teaching staff of the George Washington University School of Medicine; died in Florence, S. C., Feb. 10, aged 82.

Rawleigh, George Nelson, Paducah, Ky., St. Louis University School of Medicine, 1924; also a graduate in pharmacy; died in the Western Baptist Hospital Feb. 13, aged 68.

Rice, Ollie Walker Ⓜ McAlester, Okla.; Rush Medical College, Chicago, 1897; served as city councilman and school board member; surgeon for the Rock Island Railroad; on the staffs of the McAlester General Hospital and St. Mary's Hospital, where he died Feb. 3, aged 87.

Ross, Samuel Herman Ⓜ Waco, Texas; Wayne University College of Medicine, 1935; member of the American Psychiatric Association; specialist certified by the American Board of Psychiatry and Neurology; veteran of World War II; associated with the Veterans Administration Center; died Feb. 13, aged 52.

Rothwell, John Joseph, Flushing, N. Y.; Bellevue Hospital Medical College, New York City, 1893; formerly on the staffs of the New York Foundling and Bellevue hospitals in New York City; died Feb. 15, aged 87.

Scheffel, Alfred Garland Ⓜ Beverly Hills, Calif.; Northwestern University Medical School, Chicago, 1937; specialist certified by the American Board of Orthopaedic Surgery; member of the American Academy of Orthopaedic Surgeons; fellow of the International College of Surgeons and the American College of Surgeons; veteran of World War II; instructor in surgery (orthopedic) at the University of Southern California School of Medicine; on the staffs of the California Babies' and Children's Hospital, Los Angeles County Hospital, and the California Hospital; formerly orthopedic surgeon for the police and fire departments; died in Santa Monica (Calif.) Hospital Feb. 13, aged 45.

Schwer, Carl Ⓜ Calhan, Colo.; Kansas City (Mo.) University of Physicians and Surgeons, 1927; recently appointed county physician; died Feb. 16, aged 75.

Shattuck, Martha Isabel Boger Ⓜ New Castle, N. H.; Boston University School of Medicine, 1915; veteran of World War I; on the staff of the Portsmouth (N. H.) Hospital; died Feb. 7, aged 66.

Sheaffer, Clinton Paul Ⓜ Haddonfield, N. J.; Hahnemann Medical College and Hospital of Philadelphia, 1919; died Dec. 7, aged 66.

Shelton, Samuel Wayne Ⓜ Tuscaloosa, Ala.; University of Arkansas School of Medicine, Little Rock, 1928; member of the American Psychiatric Association; veteran of World War II; formerly health officer of Winston County; served on the staff of the Hastings (Neb.) State Hospital; on the staff of the Veterans Administration Hospital; died in the University Hospital, Birmingham, Feb. 8, aged 54.

Stewart, Chauncey Calvin Ⓜ Youngstown, Ohio; University of Wooster Medical Department, Cleveland, 1907; on the honorary staff of the Youngstown Hospital Association; died in the North Side Unit of the Youngstown Hospital Feb. 15, aged 81.

Stoney, George Franklin Ⓜ Erie, Pa.; Jefferson Medical College of Philadelphia, 1910; fellow of the American College of Physicians; specialist certified by the American Board of Internal Medicine; member of The Endocrine Society; fellow of the American College of Physicians; past-president of the Erie County Medical Society; associated with the Erie County Tuberculosis Hospital, Hamot Hospital, and St. Vincent's Hospital; died in the Hamot Hospital Feb. 1, aged 72.

Sullivan, Michael H. Ⓜ Newport, R. I.; born in 1877; Harvard Medical School, Boston, 1900; for many years a member of the board of health, of which he served as vice-president and president; past-president of the Rhode Island Medical Society; in 1953 was cited by the society as the "Practitioner of the Year"; lauded by the General Assembly and the city council of his own city; in 1955 the Newport School Committee named its new elementary school after him; Newport Hospital, where he served as chief obstetrician for many years and as chief of the medical staff, dedicated a special bronze plaque to him in 1953, and in the same year he was the recipient of an honorary doctor of science degree from the Rhode Island College of Pharmacy and Allied Sciences; president of the Aquidneck Realty Company and director of the Newport Oil Company; died in the Newport Hospital Feb. 19, aged 81.

Sycamore, Leland Schofield Ⓜ Ogden, Utah; University of Tennessee College of Medicine, Memphis, 1943; veteran of World War II; on the staff of St. Benedict Hospital and Dee Hospital, where he died Feb. 17, aged 44.

Tatum, William Edgar Ⓜ *Gatesville*, Texas; Memphis (Tenn.) Hospital Medical College, 1899; died Feb. 3, aged 85.

Thornbury, Richard Henry Ⓜ North Collins, N. Y.; University of Michigan Medical School, Ann Arbor, 1924; affiliated with the Bertrand Chaffee Hospital in Springville, and Our Lady of Victory Hospital in Lackawanna; member of the board of directors of the Tri-County Memorial Hospital in Gowanda, where he was on the staff; school physician; died Jan. 7, aged 59.

Vinyard, George Thomas Ⓜ Amarillo, Texas; Barnes Medical College, St. Louis, 1894; twice president of the Potter County Medical Society; served as president of the Panhandle District Medical Society; formerly served on the city board of health and as city health officer; fellow of the American College of Surgeons; on the staffs of the Northwest Texas Hospital and St. Anthony's Hospital; died in the Underwood Clinic Hospital Feb. 11, aged 89.

Watson, Wilfred Murray Ⓜ Northboro, Mass.; Tufts College Medical School, Boston, 1937; member of the American Academy of General Practice; veteran of World War II; member of the medical staff of the Marlborough Hospital in Marlboro, where he died Feb. 12, aged 46.

Wegmann, Norbert John Ⓜ Milwaukee; Marquette University School of Medicine, Milwaukee, 1927; fellow of the American College of Surgeons; member of the Industrial Medical Association; past-president of the Medical Society of Milwaukee County; served on the faculty of his alma mater; associated with Misericordia and Deaconess hospitals; died in Fort Lauderdale, Fla., Feb. 2, aged 58.

Woodward, Clayton E. Ⓜ Decatur, Ill.; Northwestern University Medical School, Chicago, 1906; past-president of the Macon County Tuberculosis and Visiting Nurses Association; on the Selective Service Examining boards during World Wars I and II; member and past-president of the staff of Decatur and Macon County Hospital; affiliated with St. Mary's Hospital; died Feb. 13, aged 75.

FOREIGN LETTERS

CANADA

Council on Hospital Accreditation.—The program of the newly formed Canadian Council on Hospital Accreditation was formally inaugurated in Toronto in January at a ceremony with the Honorable J. Waldo Monteith, Minister of National Health and Welfare, as principal speaker. Noting that previous accreditation programs had been a joint United States-Canadian effort and that all accreditation in Canada would now be dealt with by Canadians, Mr. Monteith stressed the fact that, although the program's achievements were important, the way in which they were obtained was even more important. The program had not been imposed from above by government or any other authority, and in spite of the introduction of hospital insurance the government had no desire to become involved in accreditation, realizing that this work was best done independently by those furnishing the services designed for improvement. On the very day on which the accreditation program began the government hospital insurance plan went into effect in a 6th and a 7th of the 10 provinces. The two undertakings were related, in view of the government's stress on improving standards of performance in hospitals. The government does not regard the insurance plan as merely a fiscal project but rather as a service program, and the resources available from government sources should encourage hospitals to meet accreditation standards.

Nutritional Deficiencies in Mental Patients.—It has been asserted that vitamin deficiencies are important contributory factors in certain organic psychoses associated with alcoholism and senility. It has also been suggested that secondary nutritional deficiencies are common in patients with certain psychiatric disorders. There is, however, little factual data on the nature and extent of nutritional deficiencies among mentally ill patients. Gregory and Paul (*Canad. M. A. J.* 80:186, 1959) attempted to compare the incidence of various nutritional deficiencies in certain groups of psychiatric patients at the time of admission to a mental hospital, before being placed on a standard diet. They studied 312 mental hospital patients and compared the results with those in 71 hospital employees. Analyses were made for deficiencies in the vitamin B group, ascorbic acid, vitamin A, carotene, and protein. When the patients were classified in such diagnostic groups as schizophrenia, affective psychoses, organic psychoses of senility, psychoneuroses, and alcoholism no statistically significant variations in the incidence of deficiencies were found. Although lower rates of relative deficiencies in certain vitamins were noted among hospital employees, these findings were related to marked and significant fluctuations in incidences of deficiencies recorded through the progress of the investigation.

Surgical Results of Mitral Valvotomy.—A series of 103 consecutive cases of mitral stenosis were operated on by the same surgeon in Montreal, and 95 of these were followed up by the associated cardiologist who has reviewed the results (*Canad. M. A. J.* 80:168, 1959). Patients were selected for operation according to currently accepted criteria. The follow-up study suggested that the absence of an opening snap or rather a sound heard in diastole in the mitral area, if combined with heavy calcification of the leaflets, was a poor prognostic sign, probably contraindicating operation. As regards mitral regurgitation, increasing importance was attached to the apical systolic murmur, and the correct diagnosis was made in 25 of 29 patients who had mitral stenosis with insufficiency. A positive diagnosis of tricuspid regurgitation may be made if Carvallo's sign is positive, the apical systolic murmur diminishes on treatment, and cardiac catheterization reveals diagnostic pressure curves in the right auricle. The operative risk was small (less than 2%) and could be reduced further if patients were operated on before the late stages of cardiac enlargement, immobile mitral valves, or incompletely controlled heart failure was reached. The results were worth while, even in those with mitral regurgitation, provided there was sufficient stenosis to relieve and the valve leaflets were mobile.

District Care for Mental Patients.—The Health Minister for Ontario reviewed plans for a radically new program in the treatment of mental illness. His plans will make treatment available at the community level, involve segregation of 12,000 hopelessly ill mental patients, and allow for diagnostic and treatment centers in larger cities with a sufficient staff to carry on outpatient day care, night care, and short-term inpatient treatment. The family physician will be able to refer his patients to the local mental health center just as he would to other specialized centers, and commitment papers will no longer be necessary for admission. Mental hospitals will be divided into units of 250 to 300 beds, each with its own staff, and research will be

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The items in these letters are contributed by regular correspondents in the various foreign countries.

arranged not only for short-term but also for long-term patients, because the major problem in psychiatry is the cause and cure of schizophrenia and most long-term patients are schizophrenic.

Spinal Traction.—One of the advantages of spinal traction in painful back and neck conditions has allegedly been vertebral separation. Lawson and Godfrey (*M. Services J. Canada* 14:762, 1958) therefore examined radiologically a group of 22 patients before and during cervical or lumbar traction at Sunnybrook Hospital, Toronto. For cervical traction they used an overhead suspension with a head sling, and for lumbar traction they used a Scott traction frame. They found that spinal traction with weights up to 100 lb. on the cervical area or 150 lb. on the lumbar region for varying periods resulted in no significant separation of the vertebrae, although cervical traction resulted in a slight temporary increase in height.

DENMARK

Hypofibrinogenemic Hemorrhage in Pregnancy.—Ejby-Poulsen and Brandt-Nielsen (*Acta obst. et gynec. scandinav.* 37:472-481, 1958) treated five patients who had hypofibrinogenemic hemorrhage by means of fibrinogen infusion. These included three who had premature separation of the placenta, one in whom it occurred during cesarean section where the possibility of intravascular escape of the amniotic fluid was present, and one who had a manual removal of the placenta and in whom plasminogen activator was demonstrated in the blood. The mode of origin in this last patient was thought to be that plasminogen activator from the uterine muscle entered the blood stream after trauma from the uterine muscle at intrauterine operation. All five patients were treated with fibrinogen made from human plasma at the State Serum Institute, Copenhagen, with subsequent rapid reestablishment of the clotting ability of the blood. No severe complications that could reasonably be attributed to fibrinogen infusion were seen.

FINLAND

Tuberculous Laryngitis.—Indirect minor laryngoscopy of 350 tuberculous patients was made at Satakunta Sanatorium by Palva and Huhti (*Acta tuberc. scandinav.* 36:125-132, 1958). Active tuberculous lesions were found in 3.5% and inactive and old fibrotic lesions in 2.5%. Active, long-standing tuberculous laryngitis was associated with far-advanced pulmonary disease of long duration and resistant to treatment. Antituberculous medication in these patients generally removed the pain, whereas the laryngeal changes remained stationary. These resistant infections represented about 25% of the total of the laryngeal lesions, while 75% healed well with streptomycin, PAS, and isoniazid combined. The authors concluded that routine examination of sanatorium patients by the laryngologist was not necessary, but that all patients presenting laryngeal trouble, even in the form of slight hoarseness, should be carefully examined.

17-Hydroxycorticosteroid Levels After Electroshock.—The effect of electroshock and electrostimulation and of emotional factors on the content of free 17-hydroxycorticosteroids in plasma were studied in 12 patients after electroshock therapy, in 5 after electrostimulation, and in 6 controls by Kallio and Tala (*Acta endocrinol.* 30:99-108, 1959). The control level of free 17-hydroxycorticosteroids in the plasma before the electroshock was 19.6 mcg. per 100 ml. The electroshock caused an increase of 9.8 mcg. per 100 ml. in the mean content of free 17-hydroxycorticosteroids in the plasma after 15 minutes. The rise was of short duration. Even after three hours the mean level was lower than before the electroshock. The wide individual variations were thought to be due to the fact that electroshock does not cause maximal stimulation of the adrenal cortex and its metabolic factors. The control level of free 17-hydroxycorticosteroids in the plasma before electrostimulation was 16.9 mcg. per 100 ml. After a slight electrostimulation with no convulsions there was an increase of 5.9 mcg. per 100 ml. in the mean level of free 17-hydroxycorticosteroids in the plasma. In the control subjects no significant changes in the mean content of free hydroxycorticosteroids were observed. The authors concluded that emotional factors had no or little influence on the rise of free 17-hydroxycorticosteroids in the plasma observed after electroshock and electrostimulation and that electroshock and electrostimulation cause a rapid but transient activation of the adrenal cortex.

Psychic Disturbances After Thyroidectomy.—A series of 53 patients who within five years prior to the examination had undergone thyroidectomy were reported on by Henrik Carpelan (*Finska läk.-sällsk. handl.* 101:60-67, 1958). Of the 46 women in the series 16 had preoperatively suffered from exophthalmic goiter or toxic adenoma, whereas 21 were nontoxic and with 9 the diagnosis remained uncertain. Only two of the seven men had been toxic prior to the operation. Eight of the patients were psychotic. Among the formerly toxic patients depressive and neurasthenic features dominated. In the nontoxic patients the main blame was laid to the faulty preoperative diagnosis, but different psychodynamic factors in connection with the operation and the organ involved were contributory. In the toxic patients the psychopathological sequelae were due mainly to psychic factors inherent in the psychogenesis and psychodynamics of thyrotoxicosis. The author stressed the importance of the doctor-patient relationship for the outcome of the operation on the basis of comparison with 28 patients who postoperatively had not needed psychiatric care.

Gastroscopy.—The roentgenographic and gastroscopic findings were correlated in 71 patients in whom the diagnosis was established at operation or at autopsy by Marcus Sundberg (*Finska läk-sällsk. handl.* 101:38-47, 1958). Of 29 patients with ulcer the x-ray diagnosis was found correct in 72.4% and the gastroscopic diagnosis in 55.2%. Of 28 with carcinoma, the x-ray diagnosis was conclusive in 53.6% and the gastroscopic in 75%. Of five patients with polyposis, the x-ray diagnosis was correct in 60% and the gastroscopic in 80%. In nine additional patients, the operation did not reveal any lesions in the stomach. The gastroscopic diagnosis was correct in all these patients, whereas the x-ray examination was conclusive in only 22.2%. The author commented that gastroscopy was of value as a complementary diagnostic procedure. This value was elucidated by the fact that of 28 patients with carcinoma 4 were detected only by gastroscopy and that in 2 additional patients with carcinoma and 3 with ulcer gastroscopy confirmed an uncertain x-ray diagnosis.

Reticulocyte Reaction in Hypoxia.—Krister Nordström (*Finska läk.-sällsk. handl.* 101:48-59, 1958) reported that 143 volunteers were subjected to hypoxia, the inhaled air containing varying amounts of oxygen. The tests aimed at revealing the sensitivity of the bone marrow to oxygen fluctuations as indicated by the reticulocyte reaction. Lowering of the oxygen saturation of the blood to 82% or less by breathing 13.5, 12, 11, 10, and 9% oxygen resulted in one or more relative reticulocyte counts exceeding the higher of the two control values. Five blood samples were taken within two hours after the test, and the reticulocytes were counted in the same period. The magnitude of increase was 20%. The error of the method in the control series was 12%. Lowering of the oxygen saturation of the blood to 93 and 85% by breathing 18, 16.5, and 15% oxygen and in some instances 13.5 and 11% resulted in a 16% increase in the reticulocyte count of half the subjects. In the others within the same saturation area, decreased values of the same magnitude occurred. This division was not due to the dispersion of the method, as true increases and decreases were recorded. In the phase of increase, the reticulocyte reaction was often associated with a shift to the left, followed by rapid reversion to the normal distribution of cells of the various groups of maturity or by a negative phase combined with a shift to the right. The negative and the positive phases were frequently of equal magnitude. The negative reaction was often combined with a shift to the right. The course of the reticulocyte reaction, as seen from the variation in total figures and as a shift in the distribution of cells in the different groups of maturity, favored the assumption of there being an adjusted accelerated speed of maturation in connection with oxygen deficiency. No definite conclusions were reached by the author as to the effect of hypoxia of short duration on the reaction of the erythrocytes.

FRANCE

Hospital Teaching Reforms.—On Sept. 17, 1956, an interministerial board under the presidency of Prof. R. Debré, president of the National Academy of Medicine, was created to study hospital teaching. This committee ascertained that the number of professors had not increased in proportion to the number of students and that university teaching was too theoretical and was lacking in clinical application. The board proposed to modernize teaching by dividing it into three phases. The first three years of medicine would be dedicated to basic sciences and to elementary clinical work. In the next three years students would spend their entire time in the hospital and university clinics. The third phase would be limited to future researchers. The project proposed to reduce the competition for the externships and to unify hospital and university functions and careers in such a manner that the medical care of patients, teaching, and research would be the responsibility of the same faculty members. Their recruiting would be carried out by national competition among the interns. Faculty positions would be on a full-time basis.

Congress of Allergists.—At the Third Congress of Allergists in Paris, in October, Sidi and co-workers reported that they treated 15 patients who had eczema by placing 20 to 50 mg. of heparin under the tongue daily for one to three months. Of these 11 showed marked improvement.

ICELAND

Leprosy.—Gudmund Benediktsson (*Laeknabladid* 42:71-80, 1958) stated that the incidence of leprosy had decreased in Iceland. In 1901 there were 169 lepers; in 1920 there were 67; in 1940 there were 22; and in 1958 there were 8. A new case was reported in 1957 in a 60-year-old woman. From the ages of 6 to 18 years the patient had lived with her aunt, who suffered from leprosy, but since then she had not been in contact with any person known to be suffering from the disease.

INDIA

Oxytocics in the Third Stage of Labor.—M. D. Adatia (*Journal of the Indian Medical Profession,* vol. 5, December, 1958) studied the comparative merits of methylergonovine and a combination of ergotamine and ergonovine in the management of the third stage of labor. Of 100 consecutive patients, 46 received methylergonovine and 54 received the mixture. These two drugs are now commonly used in the third stage of labor and the former is claimed to possess oxytocic properties superior to those of ergonovine as regards speed and duration of action. Ergonovine combined with ergotamine is supposed to have a more lasting oxytocic effect than ergonovine alone. Thirty patients were given 1 cc. (2 mg.) of methylergonovine intramuscularly and 16 were given the same dose intravenously. The dosage of the mixture was 1 cc. (2.5 mg.) of ergotamine tartrate and 0.125 mg. of ergonovine tartrate. It was given intramuscularly to all except 18, who received it intravenously. The average amount of blood loss after methylergonovine was about half of that lost after the use of the mixture. The oxytocics had a more pronounced action in multiparous women in controlling the blood loss. Methylergonovine also caused a greater reduction in the duration of the third stage of labor. This capacity had no relation to parity.

The fundal height immediately after expulsion of the placenta did not vary significantly in the two series. Thus the action on uterine contraction of the two preparations was about the same. Daily palpation of the fundus to evaluate involution revealed an equally satisfactory involution in the two series. Estimation of blood pressure showed a significant elevation of blood pressure after the administration of the mixture as compared to the other group, where it was hardly affected. No complications such as retention of the placenta were met with in either group. On the whole, methylergonovine was found to be a more efficient oxytocic than the combination of ergonovine and ergotamine, both as regards control of blood loss and duration of the third stage of labor. The absence of serious side-effects and lack of pressor action were further advantages.

Self-sufficiency in Medical Supplies.—India will soon achieve self-sufficiency in the matter of her requirements of drugs and x-ray equipment. The Soviet delegation which toured the country in the first week of October, 1958, investigated the possibility of setting up four plants for the manufacture of certain drugs that have not hitherto been manufactured in India. In 1957, India imported about 27 million dollars worth of drugs from foreign countries in spite of the great progress she had made in the last 10 years in this direction. The Soviet-Indian Commission will finance and work five different projects according to the report they presented to the Ministry of Industries. These are the manufacture of synthetic drugs, alkaloids from Indian medicinal herbs, surgical equipment, antibiotics, and hormones. For these projects, the Soviet Union has offered credit facilities as well as technical assistance.

Planned Parenthood.—In a paper read before the International Conference on Planned Parenthood in New Delhi in February, S. Chandrasekhar described the work carried out by a rural clinic established by the Indian Institute for Population Studies in Madras. The experience gained at this clinic gives cause for hope that a program to limit the expansion of population can succeed in rural India. It shows that by and large the traditional conservative attitude has disappeared and that there is a healthy desire for knowledge. This clinic was established by the institute three years ago. The institute conducted a census in the village and nine adjacent hamlets in January, 1956. It was found that the total number of married women between the ages of 15 and 45 was 673. In course of time the staff of the clinic contacted all those women. Of them, 632 were persuaded to visit the clinic. They were convinced of the need to limit the size of their families either because they could not afford another baby or because their health was poor.

During the period of observation, ranging from 2 to 20 months, 192 of these women conceived because they did not use contraceptives. Though the remaining 440 women have not conceived, the success of the experiment has not been established beyond doubt. The birth rate at the end of five years must be calculated before a conclusion can be reached. The village in question is representative of the country in every sense. An attitude survey showed that 72% of the couples did not want more children; 55% of the husbands and 58% of the wives were in favor of family planning through the use of contraceptives. Discussion with the villagers revealed a profound ignorance of the subject. Under the present socioeconomic and cultural conditions prevailing in Indian villages, the easiest and most effective way to solve the problem seems to be either vasectomy or salpingectomy. Of these two surgical methods of permanent conception control, vasectomy should be given the widest publicity, according to the author.

At the sixth meeting of the Central Family Planning Board in New Delhi in February, the Health Minister said that the day was fast approaching when the government would have to provide family planning facilities on a universal scale at almost every place where medical and public health centers existed. The urgency of the population problem for India was underlined by Sir Julian Huxley who said that India's failure to solve the problem would mean political and social disaster for the country. India's population, at its present rate of increase, would double itself in the next 45 years. This explosive increase must be checked, if India is to develop economically. From a purely economic point of view, expenditure on population control measures would be one of the most profitable forms of investment for India.

Spinal Arachnoiditis.—A. Singh and co-workers (*Journal of the Association of Physicians of India,* vol. 7, January, 1959) observed several cases of paraplegia of a type which was formerly labeled as "obscure paraplegia" but which was actually spinal arachnoiditis. Thus of 100 patients with paraplegia who were investigated fully, spinal arachnoiditis was detected in 10. In four the diagnosis was confirmed by laminectomy while in the rest it was based on clinical findings and investigations such as myelography. Most of the patients were farmers between 15 and 50 years of age who had been leading an active life. All complained of progressive weakness starting in one lower limb and spreading quickly to the other limb or starting simultaneously in both. Five had root pains. Sphincters were involved in later stages in all but one, starting with hesitancy of micturition and going on to urinary retention with overflow. Six patients gave a definite history of trauma, which was also evident radiologically in five.

The higher cerebral functions and cranial nerves were unaffected while almost all showed the classical signs of spastic paraplegia. Three patients also showed evidence of upper motor neurone lesions in the upper limbs. Five had sensory disturbances. In three the paralysis had reached the stage of paraplegia in flexion and in seven it was still in the stage of paraplegia in extension. Roentgenograms of the spine showed either evidence of old injury in the form of wedging of one vertebra, narrowing of an intervertebral space, or localized osteoarthritis in all but one. Spinal manometry showed the presence of complete block in the subarachnoid space in five. The cerebrospinal fluid showed marked increase in proteins in six. Myelography was performed in nine and showed a complete blocking of the dye in two and a delay in its transit in two others. Laminectomy was performed on four patients. One of these became worse after operation and the other three showed slight improvement but none of them made a complete recovery.

Operations on the Rheumatic Heart.—R. H. Betts and co-workers (*Journal of the Indian Medical Association,* vol. 32, Jan. 16, 1959) stated that rheumatic heart disease is almost as common in India as in the Western countries. They have not operated for aortic stenosis but four patients with aortic regurgitation were operated on and Hufnagel valves inserted in the descending aorta. All four patients were improved after operation and the improvement has been maintained. The authors believed that operation on the mitral valve for any reason but the relief of symptoms is not justified. They strongly recommend that all patients suffering from rheumatic heart disease be referred to a cardiologist for assessment of the possibility of surgical relief as soon as symptoms develop, instead of being offered a long course of medical therapy. The best results from mitral valvulotomy were obtained in patients with pure mitral stenosis.

Operative treatment should be offered at any stage of the disease provided mitral stenosis is the predominant lesion and the patient can withstand the operation. The ages of the patients in the authors' series varied from 9 to 40 years. Patients under 20 with symptoms are commonly seen in India. Operation should be avoided in the presence of clinically demonstrable rheumatic activity as long as improvement continues. The presence of slight to moderate mitral regurgitation does not necessarily mean that a good result will not be obtained, although it is less certain in such patients. Auscultation alone is unreliable in evaluating the patients with prominent apical systolic murmurs. The presence of an apical systolic murmur, even though loud, in a patient with mitral stenosis does not always mean that the patient will not be benefited by a valvulotomy. If the associated diastolic murmur is not definite, the lesion is usually purely regurgitative.

Cardiac catheterization helps in recognizing significant degrees of mitral insufficiency. Forty patients were subjected to cardiac catheterization. Several of them who had loud systolic murmurs but no evidence of regurgitation were benefited by operation. The presence of auricular fibrillation is not a contraindication to operation. Such patients do well if the ventricular rate is controlled by digitalis. Some patients with a cardiothoracic ratio of 60 to 70% have had excellent functional postoperative results. Moderate cardiac enlargement does not preclude surgical treatment. A series of 123 patients with mitral stenosis were operated on. Most of them were improved after operation; 18 died.

Pulmonary Amebiasis.—G. Victor (*Antiseptic,* vol. 55, December, 1958) reported a series of 15 patients with pulmonary amebiasis, the youngest being 16 years old and the oldest 62. Cough with expectoration and pain over the right lower portion of the chest were the common presenting symptoms, others being fever, abdominal pain, nausea, anorexia, dyspnea, and swelling in the abdomen and right side of chest. One patient raised blood-stained sputum. Only four patients gave a history of dysentery, the minimum interval between the occurrence of intestinal amebiasis and onset of pulmonary symptoms being 1 month and the maximum 12 months. Clinically, there was dulness to percussion over the base of the right lung, diminished respiratory movements, and presence of rales and rhonchi in most patients. The liver was palpable and tender in 13. The total leukocyte count varied between 5,200 and 16,800, the polymorphonuclear cells being predominant in 10 patients while the lymphocytes were increased in 5. One patient had an eosinophilia of 22%.

The sedimentation rate ranged between 5 and 120 mm. Stools contained cysts of Entameba histolytica in two patients only, two others showing Ancylostoma and whipworm ova. Only one patient had chocolate colored sputum containing trophic forms of E. histolytica, two others showed staphylococci and streptococci, and two others showed only pus cells. Sigmoidoscopic examination revealed a granular mucosa, with mucus and blood, in only one patient. Radiologically all the patients showed involvement of the right side of the chest. Treatment consisted of such drugs as emetine, diiodohydroxyquin, and chiniofon enemas. Both clinical and radiologic response was observed with medical treatment in all but one patient and he left the hospital against medical advice.

Peculiar Jaundice.—The recent outbreak of jaundice in Malda, West Bengal, was found to be viral in origin. Two physicians from the Calcutta School of Tropical Medicine, after studying the disease on the spot, brought specimens of blood and stools of some of the persons attacked for examination. The virus was suspected to have been carried from Nepal by a group of laborers. The disease started spreading within a short time and attacked about 90 persons in one village. It did not, however, spread to other villages and there were no deaths. Unlike the common type of infectious jaundice, this variety was very infectious and very acute.

Brucellosis in Children.—T. N. Mathur stated that brucellosis in children is not so rare as is usually supposed. In addition to the 11 cases reported earlier, he has reported another 13 cases in the *Indian Journal of Child Health* (vol. 8, January, 1959). These patients were first given a diagnosis of chronic tonsillitis, typhoid, malaria, amebic hepatitis, secondary syphilis, pulmonary tuberculosis, tuberculosis of the hip, and sciatica. Typhoid was the most common erroneous diagnosis and, as chloramphenicol brings about cure of both diseases, often no further investigations were made. Only 6 of the 13 patients complained of pain in the joints. Joint pains are thus not an important feature of the disease in children. All the patients but two showed a significant titer of agglutination for Brucella antigen. Two showed blood cultures positive for Brucella melitensis. Of the 13 patients, 2 came from rural areas, 3 had contact with cattle, 2 had drunk unboiled milk, and 4 denied having done so. Brucellosis should be looked for in all children with unexplained fever, even if there is no definite history of contact with cattle, sheep, or goats.

Chloramphenicol Therapy in Children.—P. N. Taneja and co-workers (*Indian Journal of Child Health,* vol. 8, January, 1959) described the toxic effects of chloramphenicol noted during short-term therapy with this drug in children. A series of 748 children suffering from different diseases were treated with chloramphenicol. Total and differential leukocyte counts were made twice a week or more often if necessary. Of the total number 91, or 12%, developed complications due to the drug. These included hematological complications (granulocytopenia, pancytopenia) in 31, stomatitis in 35, diarrhea in 20, vomiting in 3, and allergic rash in 2. The average dose of the antibiotic used in this series was 50 mg. per kilogram of body weight per day. The duration of treatment varied from less than a week to three weeks.

Most of the complications developed in the first two weeks of treatment. Thus granulocytopenia was noted in 27, more often by routine blood examination than by clinical manifestations. Of the 27 patients 23 showed no clinical manifestations. Granulocytopenia appeared at the earliest on the 3rd day and the maximum interval was 10 days. Four patients developed this complication while still receiving cortisone or ACTH along with the antibiotic. Some patients reacted promptly to withdrawal of chloramphenicol but others had not recovered when last seen. Pancytopenia occurred in one 7-month-old child who had received the drug for seven days. He was brought to hospital for a sudden pallor of one day's duration and was afebrile at the time. He recovered with blood transfusion and penicillin therapy. A fall in hemoglobin level occurred in one patient on the fifth day of treatment. Methemoglobinemia was noted in one patient who was also receiving cortisone. Stomatitis, varying in intensity from mild to severe, occurred in 35 patients, in 2 of whom the drug had to be withdrawn because of the severity of this complication. This complication occurred after varying periods of treatment, the shortest being 1 and the longest 12 days.

Twenty patients who developed diarrhea showed a marked improvement on changing over to parenteral therapy. Parenteral therapy was also resorted to with favorable results in the three who developed vomiting. The allergic rash disappeared in one patient on withdrawal of chloramphenicol and administration of antihistaminics while the other patient with this complication died of aspiration pneumonia. The age of these patients varied from less than 1 year to 12 years and the largest percentage of complications occurred in those between 3 and 6 years old. Cortisone and ACTH did not prevent the occurrence of hematological complications. The incidence and severity of complications were independent of the dosage used, marked granulocytopenia having been noted even when only 25 mg. per kilogram of body weight per day was given. The degree of depression in the leukocyte count had no prognostic value as regards the speed of recovery, although the earlier the complication was detected the better the prognosis.

Patients showed variable response to withdrawal of the drug. Those with granulocytopenia or pancytopenia without any clinical manifestations had a better prognosis than those with manifest complications. Of the 5 who had clinical manifestations of hematological complications, 3 died in the hospital and 1 left in a poor condition, but the 26 with nonmanifest hematological complications all survived. All those with stomatitis were already receiving multivitamin and vitamin B complex preparations. Thus probably some other factors were responsible for this complication. Vomiting and diarrhea were possibly due to the local irritating effect on the mucosa and patients with these conditions responded on changing the route of administration to parenteral.

Encephalitis.—Patel and Tandon (*Current Medical Practice*, vol. 3, January, 1959) treated 11 patients who had encephalitis. Besides symptomatic treatment and maintenance of fluid and electrolyte balance, these patients were given tetracyclines and steroids. The antibiotics were given parenterally at first and later orally as the general condition improved. In severe cases the drug was given in a dosage of 100 to 250 mg. by slow intravenous infusion every eight hours, and in mild cases 100 mg. was given every eight hours till the fever came down. This was continued for three or four days after the temperature reached normal and remained so. The steroids used were ACTH, corticotropin gel, and prednisolone. A slow intravenous infusion of 25 units of ACTH per day spread over six to eight hours was given. The gel was given in a dose of 40 units per day intramuscularly, and the dose of prednisolone was 10 mg. every eight hours, the dose being gradually reduced as the condition improved.

The slow intravenous infusion of ACTH was the treatment of choice as it gave a prolonged action with a minimal amount of the drug. Seven of the 11 patients recovered. In five of these fever came down within 48 hours of starting therapy with the antibiotics and steroids. Headache persisted in most patients for about a month after the fever came down. The spinal fluid sugar level came down to normal with clinical recovery while the cells and proteins also showed a fall. The average stay in hospital was 10 to 15 days. Sequelae were noticed in only one patient in the form of a slight mental imbalance. On the whole the results were encouraging with the combined use of broad-spectrum antibiotics and steroids.

ISRAEL

Uptake of Radioiodine by the Infarcted Heart.—At a meeting of the Israel Medical Association in Jerusalem, F. Dreyfuss and co-workers reported on the results obtained when radioiodine (I^{131}) was given to four patients with a recent anterior wall myocardial infarction, six with posterior wall infarction, and nine controls. They were given 100 to 200 μc of carrier-free I^{131} by mouth. The patients with infarction were usually examined within three weeks after coronary occlusion. Readings were made by exploring the precordium with a scintillation counter. Readings were taken at 30-minute intervals for the first six hours, followed by daily readings for one to three weeks.

A definite difference was found in the counts in patients with myocardial infarcts and the controls. In the first six hours after the administration of I^{131} absolute counts of 10,000 to 40,000 per minute were obtained over the precordium in all patients. One day later counts of 1,600 to 4,500 were observed in the controls, but the counts in the patients with infarcts on the corresponding day were higher and ranged between 6,350 and 9,000 for anterior wall infarcts and between 3,000 and 5,500 for posterior wall infarcts. They continued to be higher in the patient group 48 hours and six or seven days, respectively, after the ingestion of I^{131}. For the first few hours higher readings were obtained over the heart than over the right side of the chest in all subjects. This phenomenon was explained by the initially high level of circulating I^{131} before it was cleared by the thyroid, kidneys, and liver. The difference observed after 24 to 48 hours and six to seven days must be caused by a significant uptake of I^{131} by the infarcted heart.

One of the patients with posterior wall infarction died seven days after the administration of I^{131} as a consequence of his severe cardiac lesion. At autopsy on the following day two infarcted areas were found. In both of these areas the concentration of I^{131} was about 50% higher than in the intact heart muscle. Tissue samples taken from the intact areas were tested for radioactivity. The homogenized material from the infarcted areas had concentrations of I^{131} 50 and 70% higher, respectively, than the intact myocardium. Necrotic heart muscle apparently takes up more I^{131} than heart muscle not so affected.

NORWAY

Dissecting Aneurysm.—In a series of about 700 cerebral angiographies by means of the usual percutaneous technique, three deaths were reported by Kjell Liverud (*J. Oslo City Hosp.* 8:209-241 [Nov.-Dec.] 1958). In these three cases an obliterating dissecting aneurysm developed on the injection of the contrast medium at the site of puncture of the common carotid artery. Death was attributed to obliteration of the carotid artery. The investigations were made by three investigators, which makes it unlikely that it was due to an individual mistake in technique. The accident was caused by the sharp tip of the needle in the vessel wall during injection. In order to prevent further accidents of this kind the author considered it essential to alter the technique and the sharp needle in the vessel was replaced by a flexible polyethylene catheter introduced percutaneously.

This procedure has the advantages of safe intraluminal injection; freer choice of projections; choice of internal, external, or common carotid angiography in the same investigation; easier diagnosis of carotid thrombosis; and better bilateral filling of the cerebral vessels during contralateral carotid compression. The patient is in a comfortable position between injections which may be made at longer intervals to reduce the action of the contrast medium on the cerebral vessels. The investigation may be performed by one man and take place in a quiet atmosphere as a routine procedure. By lengthening the catheter the exposure of the investigator to x-rays can be reduced. In rapid serial angiography the catheter may be connected with an automatic pressure syringe, and it is then not necessary for the investigator to stay in the radiography room for the numerous exposures. The procedure has been used as routine in about 1,000 cases without fatal complications.

Pyrazinoic Acid Amide and Cycloserine for Tuberculosis.—Birkeland and Nissen-Meyer (*Acta tuberc. scandinav.* 34:98-109, 1958) sudied a series of 30 patients with far advanced pulmonary tuberculosis and bacillary resistance to at least two of the principal antituberculous drugs; 13 were selected at random for treatment with pyrazinoic acid amide and 17 received this drug plus a small dose of cycloserine. The bacteriological and radiologic results of three months' treatment were on the whole modest in both groups; complete disappearance of cavities was not seen in any patients and sputum conversion in only a few. In the evaluation of these results, the type of case must, however, be considered. All patients had widespread cavitary disease of long duration and with extensive fibrotic changes. This type of patient generally responds poorly to medical treatment, and even without drug-resistant tubercle bacilli outstanding results could not have been expected from the best combination of our three principal drugs.

The results obtained with pyrazinoic acid amide and with this drug combined with cycloserine could not be compared with certainty because of the small number of patients in each group. The bacteriological and radiologic findings, however, suggested that pyrazinoic acid amide plus a small dose of cycloserine was more effective than pyrazinoic acid amide alone. The toxic effects of the drugs observed in the present series were all reversible. They were, however, so severe and unpleasant that the use of these drugs should be reserved for patients who cannot be treated with a combination of the principal drugs, either because of intolerance or because of bacillary resistance. If one of the principal drugs cannot be used, it should be tried in combination with one of the new drugs. Controlled trials have already shown that the effect of pyrazinoic acid amide combined with either streptomycin or isoniazid was comparable to any combination of the three principal drugs.

In patients in whom none of the principal drugs can be used successfully, treatment with pyrazinoic acid amide plus a small dose of cycloserine may be worth a trial, particularly if a successful medical treatment can make the patient fit for additional surgical treatment. Unfortunately, most patients with bacillary resistance to the principal drugs, like most of those in the present series, have processes which respond poorly to chemotherapy and a respiratory function which excludes surgical treatment. In such patients, the advantage of a moderate and perhaps temporary effect of the drugs must be weighed against the risk of possible toxic complications. A definite indication for pyrazinoic acid amide plus cycloserine will, however, be present in patients in whom surgical treatment of an old cavity in one lung is contraindicated by an acute spread to the other lung, which, because of drug-resistant tubercle bacilli, cannot be expected to respond to treatment with the principal antituberculous drugs.

PORTUGAL

Physiotherapy of Periarthritis. — Albano Ramos (*O Medico*, no. 365, 1958) stated that calcified periarthritis of the shoulder has an obscure etiology. Among the various causes suggested the most likely is direct or indirect trauma. A similar lesion appears rarely in the hip, elbow, or knee. The fibrous form of periarthritis lends itself to erroneous interpretation, as the roentgenogram does not define the diagnosis. This is not true of calcified periarthritis. Treatment includes drugs for the pain and muscular rigidity, adrenocortical hormones, surgical ablation of the calcarious deposits, physiotherapy (mobilization, galvanization, faradization, diathermy, and ultrasound). The author concentrated on radiotherapy. With this method he observed almost 85% of cures with an almost constant regression of calcification. The best means to fight this disease is, however, to prevent it. Immediately after an articular trauma the region should be irradiated, even through the plaster cast, for the earlier the radiation the greater the chances of nonformation of calcareous deposits. Their accumulation, forming large calcifications, reduces or delays the patient's chances of cure.

Spinal Amyotrophy.—Diogo Furtado (*Arquivo de Patologia* 30:522-532, 1958) stated that the fatal prognosis in patients with hereditary muscular atrophy, which was part of the classical conception of this disease, is being contested by several observers. The author observed a typical case of this disease, with biopsy and electromyographic confirmation of the diagnosis, which started when the patient was 2 years of age, progressed until he was 14, and then underwent remission. The prognosis is not therefore so grave as it was originally thought to be.

Cryptorchism.—M. Fernandez e Fernandes (*Gazeta Medica Portuguesa*, vol. 11, no. 3, 1958) reserved the term cryptorchism for irreducible or permanent absence of a testis within the scrotum, due to its detention in the physiological tract from the abdominal wall to the scrotum. Examination for cryptorchism should be performed repeatedly and with the patient in various positions. In cryptorchism the testis is never of normal size. The presence of the cremasteric reflex in a doubtful case indicates a probable pseudocryptorchism. Surgical correction should not be attempted before the age of 9 years, because a spontaneous descent of the testis may occur. This limit should, however, not be rigid since the psychosexual development should be considered more than the chronological age.

Hormonal therapy is indicated in all patients with cryptorchism without complications, in those with pseudocryptorchism in whom the definite fixation of the testis has not been established before the 10th year, and also in association with surgical cases, before and after orchiopexy. A dose of 300 to 500 units of chorionic gonadotropin may be given two or three times a week, not exceeding a total of 8,000 units. With very large doses there is danger of provoking the degeneration of the gonad. Testicular therapy, which may also cause precocious virilization, should be reserved for patients with pronounced sexual infantilism, with maximum doses of 10 mg. a day for two or three weeks, always combined with gonadotropins. In patients with hypothyroidism or adiposogenital dystrophy the use of thyroid extract is beneficial. Operation is indicated in patients with complicated cryptorchism, ectopic testis, persistence of the peritoneovaginal canal, concomitant hernia, accidents of torsion, inflammatory or carcinogenic processes, and in those in whom, after the age of 11 or 12 years, the hormonal treatment has produced no effect.

Iron and Cobalt in the Treatment of Anemia.—Soares and Moreau (*Gazeta Medica Portuguesa* 11:58 [May-June] 1958) stated that the intravenous use of cobalt chloride in patients with anemia had to be discontinued because of severe reactions even with doses too small to have an appreciable hematopoietic effect. On the other hand the use of a combination of iron and cobalt gave good results in patients with thalassemia, achylic chloroanemia, gastric anemia of Morawitz, acquired hemolytic idiopathic anemia, symptomatic anemia of acute rheumatism, and myeloid leukosis. The drug was well tolerated; no symptoms of thyroid hypofunction were observed, nor was there an increase of the size of the thyroid.

Aplastic Anemia.—Francisco Branco (*Arquivo de Patologia* 30:489-521, 1958) reported that damage to the marrow may be caused by benzene, trinitrotoluene, carbon tetrachloride, trichlorethylene (used in industry), lindane (an insecticide), paraphenylenediamine (used in hair dying), and thorium dioxide (a contrast medium). Drugs cited as possible causes of aplastic anemia include the organic arsenicals, gold salts, nitrogen mustards, alkaloids of colchicum, bismuth, mercury, and such antimetabolites as aminopterin and mercaptopurine. Thiouracil and other synthetic antithyroid drugs and such anticonvulsants as hydantoin and its derivatives, in spite of being regarded as responsible for refractory total medullary aplasias, are more likely to produce agranulocytosis.

Aminopyrine and quinacrine, especially when used continuously, have also been implicated. Some substances act merely as sensitizing agents in patients suffering from lability of the hematopoietic system, and this may explain why only a few of those exposed suffer from aplastic anemia. Such infections as miliary tuberculosis, leptospiral jaundice, syphilis, typhoid, brucellosis, malaria, and rheumatic fever may cause aplastic anemia. Excessive doses of streptomycin and, more frequently, chloramphenicol may also cause anemia. The poisoning effect of the latter may depend on the nitrobenzenic radical in its constitution.

SWEDEN

Combined Treatment of Tuberculosis.—Two new combinations of tuberculostatics—cycloserine-isoniazid and cycloserine-viomycin—were tried in the treatment of pulmonary tuberculosis and compared with the combination of PAS and isoniazid by I. Ståhle (*Acta tuberc. scandinav.* 34:83-97, 1958).

Cycloserine and isoniazid were given to 28, cycloserine and viomycin to 30, and PAS and isoniazid to 34 patients. The duration of treatment was three months. The tuberculostatic effect evaluated clinically and roentgenologically was fully comparable for all combinations and was somewhat better for therapy that included cycloserine. With cycloserine and viomycin, healing of cavities was remarkably good. It was not possible to study any development of resistance for in all patients the tubercle bacilli rapidly disappeared from the sputum. One patient showed initial resistance to cycloserine before treatment. The tolerance to both cycloserine and viomycin was excellent and no side-effects attributable to those agents were observed. Symptoms of intolerance to PAS and isoniazid occurred in a few patients however. Cycloserine and viomycin combined appeared to be of great value in the treatment of pulmonary tuberculosis.

Calcium Infusion Test for Sarcoidosis.—An intravenous calcium infusion was administered to 14 patients with sarcoidosis by Björn-Erik Roos (*Acta tuberc. scandinav.* 34:152-172, 1958). Nine of the patients were subsequently treated with corticosteroids and/or ACTH and three were treated with vitamin D. The patients were examined at intervals during and after the treatment. Earlier investigators showed that the urine phosphorus excretion in normal persons decreased during the intravenous administration of calcium. Only 2 of the 14 patients reacted in this manner. The others deviated in varying degree from the normal. During treatment both with corticosteroids and ACTH and with vitamin D, 11 of 12 patients so treated reacted normally to the administration of calcium intravenously. After the treatment, on the other hand, the reaction of all patients again deviated from the normal. If the 14 patients were regarded as a group, their reaction to the intravenous calcium infusion most closely resembled that observed earlier by other investigators in hyperparathyroidism. It appeared that patients with sarcoidosis might have an impaired calcium metabolism even when they do not have hypercalcemia.

Prolapse of the Uterus.—Sven Svennerud (*Acta obst. et gynec. scandinav.* 37:416-433, 1958) analyzed a series of 539 operations for prolapse of the uterus. The mortality was 1.3% and the frequency of recurrence 7.3%. In that part of the series in which the patients had the complete Manchester-repair, the frequency of recurrence was 4.6% as against 17.2% when either amputation of the cervix or colporraphy was omitted. Of 161 patients operated on before the menopause, the symptoms had appeared within one year of delivery in more than 50%, and of 388 patients operated on after the menopause the symptoms had appeared after the menopause in about 65%. Of the total number, 23% had undergone earlier complicated deliveries. Early ambulation after operation diminished the frequency of venous thrombosis from 6.5 to 3.1% and fatal pulmonary embolism decreased from five cases to none. In the group that was allowed to get up soon after the operation (163), the mortality was 0.6% compared with 1.6% of the 376 patients who rested in bed for 14 days after the operation.

The frequency of urinary tract infection also diminished, as did the length of stay in hospital after the operation (30%) with early ambulation. Administration of estrogens before and after operation promoted primary healing. Healing by second intention occurred three times as often among those who had not received estrogens. Estrogen treatment produced some ascent of the uterus and thereby made the operation more difficult. It was therefore possible that in such patients the operation might not be sufficiently radical and the risk of recurrence might thereby be increased. Of the 539 patients operated on, 1 developed carcinoma of the uterus, 3 developed ovarian carcinoma, 4 mammary carcinoma, and 14 carcinoma of the colon, stomach, or liver. Twenty-five pregnancies occurred in 15 women after the operation and the frequency of abortion was 40%. Cesarean section was not necessary and delivery was in no case complicated. The risk of recurrences after vaginal delivery was relatively small. The author concluded that the Manchester operation should always include amputation of the cervix except in young women who wish to have children later. Delivery after operation can be performed by the vaginal route. Any injury to the levator ani should be sutured at the time of delivery.

Blood Loss at Delivery.—In 18 obstetrically normal women the total amount of hemoglobin in the body (THb), the hemoglobin concentration (Hb), and the hematocrit (Hct) were measured repeatedly in peripheral blood before and after delivery by Robbe and Ström (*Acta obst. et gynec. scandinav.* 37:448-471, 1958). The maternal external blood loss at and after delivery was carefully estimated. Repeated THb measurements were made after delivery in an additional nine normal women. Measurements of the plasma volume were made before and after delivery in 9 of the 27 women. The maternal THb before delivery was slightly overestimated (by 1 to 2%), when the alveolar carbon dioxide method was used because of fetal uptake of carbon dioxide. This error was corrected.

Maternal blood loss in the placenta was estimated as 20% of the placental weight. The total maternal external blood loss at delivery and during the first week after delivery averaged 547 ml. of whole blood (202 ml. of red blood cells). At delivery and during the first two hours after delivery, 84% of the total external loss occurred. The decrease of THb up to the seventh postpartum day corresponded to a loss of 961 ml. of whole blood (355 ml. of red blood cells). The unexplained difference, 414 ml. of whole blood (153 ml. of red blood cells), was statistically highly significant. The unexplained disappearance of erythrocytes mainly occurred between a few hours before delivery and two hours after delivery. The magnitude of the unexplained difference was not correlated to the amount of the external blood loss. The plasma volume determinations were not judged to be reliable during labor. After delivery the body Hct averaged 90% of the peripheral Hct.

Prolonged Pregnancy.—L. Lindgren and co-workers (*Act obst. et gynec. scandinav.* 37:482-496, 1958) stated that they treated prolonged pregnancies conservatively. A higher proportion of male and first-born infants belonged to the group of prolonged pregnancy as compared to the group of delivery at term. The perinatal death rate for prolonged pregnancy was twice that for delivery at term. Prior to labor there was no difference between the fetal mortality rates for prolonged pregnancy and delivery at term. Asphyxia and cerebral hemorrhage accounted for the increase in the perinatal death rates during and after labor. It was found that a high birth weight did not involve the risk of increasing the fetal death rate or danger of asphyxia and cerebral hemorrhage, provided that the patients in whom cephalopelvic disproportion was diagnosed clinically were delivered by cesarean section. The incidence of forceps delivery and the proportion of fetal deaths associated with it were higher in cases of prolonged pregnancy. The rise in the perinatal death rate for prolonged pregnancy was above all observed in cases of primary uterine inertia and threatened asphyxia: the higher death rates were due (1) to the higher incidence of and higher fetal death rate for primary uterine inertia, and (2) to the higher incidence of and high fetal death rate for threatened asphyxia.

The Prediabetic Period and Obstetrics.—Lars Hagbard (*Acta obst. et gynec. scandinav.* 37:497-518, 1958) analyzed 274 pregnancies in 113 women who subsequently developed diabetes. In all these women the disease developed during their childbearing years and in most before the age of 40. No increase in the incidence of abortion was observed in these prediabetic pregnancies. There was an unusually large proportion of oversized babies (birth weight over 4,500 Gm. or 10 lb.) in that series, particularly during the last two years prior to the diagnosis of the maternal diabetes, i. e., 26.7% compared with 1 or 2% (the normal percentage). The perinatal mortality was much higher during the five years preceding diagnosis. In the two years before diagnosis 37.3% of the babies were lost perinatally. Spontaneous premature labor (before the end of the 37th week) occurred in 17.4% and in the last two years before the diagnosis 26.2% were born before the end of the 37th week. A significant proportion of the children of these prediabetic mothers showed a congenital deformity, i. e., 4% compared with 1.7% in a normal control series.

As it was believed that these complications might have been due to a disorder of the maternal carbohydrate metabolism during the prediabetic period, it was decided to make glucose tolerance tests on all women giving birth to children weighing over 4,500 Gm. These tests were also made on a number of women with an obstetric history of severely deformed or stillborn infants and in whom no obstetric or other cause of the complication was found. Altogether 189 women were examined on the fourth or seventh day after delivery. A control series of 100 women was identically examined. It was found that the average value for the blood sugar both 60 and 90 minutes after administration of glucose was significantly higher in the test series than in the control series. Using a maximum value of 220 mg. per milliliter and/or a two-hour value of 120 mg. per milliliter as criteria of abnormality, 37 or 19.6% of the test series proved to have abnormal glucose tolerance curves compared with 4 or 4% of the control series.

The high incidence of fetal complications during the prediabetic period was probably due to the fact that some of the mothers had transient unrecognized diabetes during pregnancy or at any rate had a lowered carbohydrate tolerance several years before the disease was manifest. The author believed it was not correct to use the terms prediabetic pregnancy and prediabetic state in the sense they had hitherto been used.

UNITED KINGDOM

Little Danger in Trumpeters' Loud Notes.—Prof. M. Faulkner, a professional player and teacher of the trumpet, and Prof. E. P. Sharpey-Schafer, a physician, reported in the *British Medical Journal* of March 14 on their investigations into the dizziness and occasional blackouts suffered by trumpeters when they play high, loud notes. They concluded that the musicians are not likely to come to any harm. Measurements were made as Professor Faulkner blew his hardest and loudest. Measurements were made on two other subjects, a surgeon who played the trumpet as a hobby and a novice purported to be learning the oboe. Because of the dizziness hazard many leading orchestras carry an assistant to take over from the first trumpeter in prolonged difficult passages. Wagner is said to be the composer with least consideration for the feelings of the trumpet player. A long phrase from Wagner's "Tannhäuser" was played by Professor Faulkner without drawing breath. Then he blew a loud arpeggio up to high D. On the top note he reached a pressure more than three times as great as that normally used by doctors to test circulation.

The circulatory effects of trumpet playing were similar to a forced expiratory effort with nose and mouth closed. It raised the chest pressure and checked the flow of blood in the great veins. Trumpet playing produced high chest pressures compared with other instruments, but it did not approach pressure levels induced by coughing. For orchestras with small working capital it might be possible to dispense with the assistant trumpeter if the first trumpeter wore a pilot's pressure suit, which could be surreptitiously inflated by a switch on the conductor's desk.

Reactions of Patients Told They Have Cancer.—Easson and Aitken-Swan (*British Medical Journal,* March 21, 1959) collated information from consultants who informed 231 selected patients (93 men and 138 women) that they had cancer and who recorded the comments of the patients. In the initial reaction 153 expressed approval that they had been told the truth, 44 denied that they had been told, 17 expressed disapproval, and 17 were noncommittal. Of 41 patients who were seen one to two and one-half years after the first interview 35 had not changed their views, 5 had, and 1 who initially denied that she had been told now talked freely of her condition as cancer. Of 37 who did not deny that they had cancer 26 did not mind others knowing, 10 had not let anyone know, and the attitude of 1 was not clear on this point.

There is no doubt that in Great Britain the word cancer connotes incurable disease with distressing and inevitable death. This fact must surely have its origin in experience, and only new experience rather than exhortation and reassurance will alter this conviction. It has long been British medical practice to conceal from patients the fact that they have cancer, with the consequence that the only diseases known as cancers were uncured or untreated ones. The cured cases were scrupulously labeled as something other than cancer. The effect of this "heads-I-win, tails-you-lose" policy is evident from the incredulity of patient's friends when told the truth. This general ignorance of the possibility of cure was also shown by an opinion survey in the Manchester area in 1954, when 64% of those interviewed did not know that cancer could be cured.

It would seem, therefore, to be an essential part of successful public education on cancer, and in the general interest, that some patients with the more curable types of growth should be told the diagnosis. By the same reasoning those already cured should likewise have the facts presented to them, but by then the effect is much less. If frankness of this sort could be shown, however, to have unexpected and undesirable sequelae, then such a policy would have to be abandoned, however worthy the motive for its continuance might appear. The contrary seems to have been established.

So far as can be discovered 67% of the group preferred to know what was wrong. This proportion, naturally, may measure only the success of the consultants' judgment in deciding whom to tell, but the fact remains that they seemed genuinely glad to know. In some cases telling the diagnosis had the effect of calming fears, the patient having interpreted silence or reassurance, while being referred to a hospital for cancer treatment, as meaning that his case was hopeless. Others felt that to know the truth helped them to fight better and gave them additional resources to call on, and they submitted to treatment in a different spirit and worried less.

In a different category were the 7% who claimed to have been upset by the knowledge of their diagnosis. Some of those who denied they were told may also come into this category. In some cases it was said that the frank use of "the word" was what shocked them, rather than fear that they had an incurable disease, which is itself indicative of an unhealthy state of public opinion. Some admitted that they would have preferred a lie. It must be remembered, too, that this small group of patients, however critical they may have been of the consultant's frankness, have probably had their cancers cured. Moreover, it seems likely that this figure will fall still lower than 7% as public experience grows and public opinion changes. It was concluded that, since most patients were able to accept the truth and benefit from the knowledge, all patients with the more curable cancers, unless obviously unstable, should be told their diagnosis. This is an essential part of public education on cancer, aiming at earlier treatment and higher rates of cure.

Maternity Hospital to Close.—Wiltshire mothers may soon be having their babies at a Royal Air Force station, because the Devizes Maternity Hospital is to close. Another, at Chippenham, is to be cut to one-half its bed capacity. An acute shortage of qualified midwives is the reason. Other small maternity units in different parts of the country have recently had to close or restrict admissions. Midwifery must be made more attractive if sufficient maternity beds are to become available. At present only about 20% of the nurses who qualify as midwives practice as such. Some hospital authorities have advocated a pay raise in the smaller country units, where the responsibility of the individual midwife may in any case be heavier as she has to work more on her own. Ministry of Health medical and nursing teams will soon be visiting some of the areas hardest hit. Their task will be to discover the reasons for the shortage of midwives, to advise on remedial action, and to make recommendations on which future policy can be based. Nursing staff leaders have told Ministry of Health and hospital authority representatives that their proposals for pay increases for 17,000 midwives and 50,000 student nurses were inadequate. More should also be done to improve the status of the midwife.

CORRESPONDENCE

ANTIDOTE FOR PROCHLORPERAZINE INTOXICATION IN CHILDREN

To the Editor:—Many reports have appeared recently on the toxic manifestations of prochlorperazine (Compazine). It is a valuable tool in the symptomatic relief of vomiting in gastroenteritis and measles and in newborn infants. When it is used in appropriate dosage, based on weight, complications are rare. Few more alarming situations can occur than those which are seen in children with prochlorperazine toxicity. The signs, which have been well described elsewhere, include, briefly, an opisthotonic position, rolling up of the eyes, protrusion of the tongue, inability to speak or thick incoherent speech, and catatonic posturings.

In our experience these complications are not related to dosage. We have seen them occur after as little as one rectal dose on each of two successive days and, on the other extreme, after the ingestion of a large number of spansules. We have also noted a lack of toxic manifestations in infants and very young children. Our cases have occurred in the 4-to-10-year age group. Toxicity also has not been noted with use of large doses in otherwise healthy but disturbed children. Toxicity usually has occurred in the very ill child. The suggestion has been offered that an inflamed rectal mucosa enhances absorption of the suppository, but symptoms have been produced when the drug was given by mouth, and it may be that toxicity by rectal medication may be more common only because of the more common use of this route.

In seeking some way to help these children it has seemed that strong coffee administered orally has had some beneficial effect in early and mild cases. We gave caffeine and sodium benzoate intravenously, and the results of this treatment were encouraging. In each case the caffeine and sodium benzoate was given in a dose of 0.5 Gm. In a matter of 25 to 120 seconds each child responded in a dramatic fashion. Paraspinal muscular spasm, eye rolling, posturing, tremors, and confusion were entirely relieved. Two of these children were carried into the office in an agonizing position and in severe distress but were able to walk out unassisted a few minutes later. Symptoms did not return.

Caffeine and sodium benzoate seems to be an effective and rapidly acting antagonist to the toxic manifestations of prochlorperazine. The mechanism of its action is unknown, nor do we know the factors which predispose to toxicity.

Richard W. Goldsmith, M.D.
14 W. Young St.
Somerville, N. J.

RESPIRATOR TRACHEOTOMY TUBE

To the Editor:—A comment is in order regarding the article entitled "Respirator Tracheotomy Tube" in The Journal, March 21, 1959, page 136. The idea of devising ways to decrease leaks in the system is a good one and is at times highly desirable in respirator patients. Whether a tight fit is absolutely necessary depends on one's philosophy regarding the use of respirators and on the type of respirator unit being used.

A definite danger exists in the use of this type of tube-and-cuff arrangement. The basic idea is sound and has been used by many anesthetists to administer anesthetics and to ventilate patients on the wards, but unless the inflatable cuff is cemented to the metal tracheotomy tube there is the constant hazard that the cuff will slip off and obstruct the patient's airway. Unless this situation is diagnosed quickly and the cuff withdrawn the obstruction may be sufficient to result in death. This danger is made more real in the patient being ventilated by a respirator, due to the constant motion of the tube with each cycle. In the presence of tracheal secretions, even a tight fitting cuff will tend to slide on the metal tube. Rubber cement has been used with success to prevent this. As an additional safeguard in these patients, the inflation tube to the cuff is pulled taut and clamped to the umbilical tape which holds the tracheotomy tube in place. This tends to result in the cuff riding upward rather than off the end. The cuff should be inflated with only enough air to prevent a leak around the tracheotomy tube. It is felt (and without documented evidence) that these cuffs should be deflated for a few minutes every four or five hours to prevent any damage that might result from pressure against the mucosa.

Regarding tracheotomy tubes in general for respirator patients, it seems desirable to use one made of a plastic which would soften at body temperature. This would allow the tube to conform more to the anatomic course of the trachea than do some of the standard metal tracheotomy tubes. For patients breathing on their own, this probably is not a critical factor, but the tube in a respirator patient is in a continual back and forth motion, and if the end impinges on or rubs the tracheal wall an ulceration will result in time. This has been observed, with ulcerations at the cord level, when rubber endotracheal tubes are used.

Jack B. Williams, M.D.
University of California Medical Center
San Francisco 22.

MEDICOLEGAL ABSTRACTS

Zoning Restrictions: Right of Physician to Maintain Office in Private Residence.—This was an action to restrain the defendant physician from erecting a combined home and office structure in an area zoned for single family dwellings. The trial court denied the injunction and the plaintiffs appealed to the court of appeals of Ohio.

The defendant, 10 years prior to this suit, had purchased a piece of property which was subject to a restriction that the property "shall be used for (1) resident purposes only and (2) not for any purpose of business or trade." This property was also located in an area zoned for single family residences. After the defendant had completed plans for the erection of a combination residence and office on this location, he learned that some of the nearby residents objected to the building. Although he had been told that no rezoning would be necessary, he applied to the planning commission for a change from single family residential to commercial. This was denied. He then applied for a building permit and this was also denied. The defendant was then advised by the planning commission to take his problem to the board of zoning adjustments. After a hearing before this board, the building inspector's opinion was reversed and a building permit issued. The plaintiffs then took the case to the common pleas court, where an injunction was denied.

On appeal, the plaintiffs contended the defendant was violating both the building restriction and the zoning provisions. So far as the building restriction was concerned, the court of appeals pointed out that the restriction was as to the use of the property. As long as the building was used for residential purposes only there was no restriction preventing its erection. Furthermore, the court pointed out that the restriction itself had been created to run for 35 years and that this period would expire even before the building would be completed.

The zoning ordinance referring to single family residence areas permitted certain accessory uses of property therein so long as the residential character of the property was not infringed. Among other things the ordinance provided: "The office of an architect, attorney, clergyman, dentist, engineer, physician, surgeon or other professional person may be located in a residence or an apartment used by such person as his private residence."

After a consideration of all the evidence relative to the type and character of the proposed building and the use to which the defendant intended to put it, together with the character of the surrounding and adjoining property, the court of appeals was of the opinion that no rezoning was necessary and that the defendant was entitled to erect the building and use it for a combination residence and office. The court also held that the practice of medicine was not to be classed as a trade or business.

The plaintiffs' request for an injunction to restrain the use sought by the defendant was therefore denied. *Diebel v. Wilson,* 150 N. E. (2) 448 (Ohio, 1957).

Libel and Slander: Qualified Privilege.—This was an action for damages for libel and slander against the Health Insurance Plan of Greater New York and its medical director and deputy medical director. The defendant's motion for summary judgment was heard in the Supreme Court, special term, Kings County, New York.

The defendant HIP is a nonprofit medical expense indemnity corporation. Each of the 500,000 insurees of this corporation is given a directory listing the various medical groups which will furnish services for the members and listing the names and addresses of the general practitioners and specialists affiliated with each group. The insuree selects the medical group which is to provide him with medical care. The plaintiff was a director and co-chief of surgery of one of these groups.

In 1953 the two individual defendants were informed that the plaintiff's malpractice insurance was not being renewed for cause. They made an investigation which indicated that the malpractice insurance company had paid some losses on some operations which this plaintiff had performed. Conferences were held at which minutes were recorded. The defendants maintained that they considered not only this question of malpractice insurance but also the opinion of the chief surgeon in one of the hospitals with which the plaintiff was connected and certain changes in his status on the staff of a hospital about which they claimed he made misrepresentations. It was at these conferences and hearings that the defamations complained of were made. The plaintiff avers that, generally speaking, the defamatory statements charge that he is professionally incompetent in his specialty; that appointments at hospitals were not renewed because of incompetency; that he does not possess the minimal hospital requirements of HIP; that he lacks training and skill; and that he deliberately concealed and withheld from the defendant HIP information as to his background, affiliations, and employments.

The plaintiff then went on to allege that the defendants were motivated throughout the hearings by actual malice and that the hearings were "designed to rubber-stamp a pre-determination of the individual defendants to effect his removal from the medical group of which plaintiff was a director and co-chief of surgery." To support this contention he recited some controversy and difficulties he had had with the malpractice defense board of the New York State Medical Society over the purchase of insurance.

On the record, said the court, the defense of qualified privilege was properly interposed and established prima facie. Such a privilege, however, may be destroyed by a showing of excessive publication or malice. Here, said the court, the plaintiff presented a triable issue of fact with respect to the existence of actual malice. The defendants' motion for a summary judgment was therefore denied. *Anonymous v. Health Insurance Plan of Greater New York, et al.,* 173 N. Y. S. (2) 74 (N. Y., 1958).

Malpractice: Suturing Nerve to Tendon.—This was an action for damages resulting from the alleged negligence of the defendant physician. From a judgment in favor of the plaintiff the defendant appealed to the Supreme Judicial Court of Massachusetts.

The patient, 15 years of age, had pushed her left hand through two panes of glass and suffered a laceration of her left wrist and flexor tendons. She was taken to a hospital where the defendant operated on her left wrist. The operative report showed that all the superficial tendons, except the flexor tendon to the little finger, had been severed. The deep tendons were intact. Presumably, the upper band of the severed tendon was isolated and brought down and sutured to the remainder. The skin was then closed and the plaintiff's hand was in a plaster cast and Ace bandages for several weeks. When the cast was removed she went to a hospital for physiotherapy, and it was then discovered that there was a loss of median nerve function. In a subsequent exploratory operation it was found that the proximal segment of the median nerve had been sutured to the distal portion of the superficial tendon going to the middle finger. The distal end of the median nerve was found lying free. A proper repair was done but the plaintiff continued to have a sensory loss at the base of her palm and a neuroma in her left wrist.

A medical expert who testified for the plaintiff said that the median nerve is approximately the same size as the superficial tendon, but its color is slightly different. The texture of the superficial tendon is more firm than that of the median nerve, which may be compressed with the fingers. Anatomically the median nerve is not at any time connected with the superficial tendon. In the opinion of this expert if the median nerve had been completely sutured instead of leaving one end lying loose in the wound, and if one end of the median nerve had not been sutured to the superficial tendon, the probabilities are that the plaintiff would have obtained a better result from the operation and would not have suffered a neuroma and sensory loss.

We are of the opinion, said the court, that the jury could warrantably find that the defendant was negligent in not distinguishing the superficial tendon from the median nerve, that the operation was not done with the care and skill generally used and possessed in the community, and that a surgeon who undertakes to operate in a field wherein nerves and tendons are exposed will distinguish them and not unite a nerve with a tendon.

The judgment in favor of the plaintiff was accordingly affirmed. *Fitzgerald v. Leach,* 150 N. E. (2) 12 (Mass., 1958).

MEDICAL FILM REVIEWS

Block Dissection and Pneumonectomy for Bronchogenic Carcinoma, Right Side: 16 mm., color, silent, showing time 21 minutes. Prepared by John F. Higginson, M.D., Portland, Ore. Produced by and procurable on loan from Veterans Administration, Central Office Film Library, Washington 25, D. C.

This film shows the surgical technique of right-sided en bloc dissection and pneumonectomy for bronchogenic carcinoma. Preoperative and postoperative chest x-rays are shown as well as the specimen immediately after surgery. Dissection from the cupola of the chest to the diaphragm is shown in steps. Partial resection of the pericardium is demonstrated as part of the block dissection. This is a well-done film of an accepted operation performed in an acceptable technique, although it is believed that this particular operation is now less popular than it was a few years ago. This fact, however, does not detract from the great value of this film, which, with its opposite number by the same author of a radical left-sided pneumonectomy, makes a perfect lesson for one wishing to study or learn the technique of this operation for either right or left side. The surgical technique and photography are excellent. It is most suitable for showing to surgeons, particularly thoracic surgeons and surgical residents interested in thoracic surgery.

Fascial Transplantation for Paralyses of the Abdominal Wall: 16 mm., color, sound, showing time 11 minutes. Produced in 1958 by Billy Burke Productions, Hollywood, for C. L. Lowman, M.D., Los Angeles. Procurable on loan from E. R. Squibb and Sons, 745 Fifth Ave., New York 22.

This excellent motion picture describes and illustrates the indications and technique for fascial transplantation in paralysis of the abdominal muscles. The procedure was originated by the author. Several patients with paralysis of the abdominal muscles after poliomyelitis are demonstrated before and after the operation. The film shows the importance of the abdominal muscles as a link joining the pelvis and thorax and the part played by these muscles in coordination of movement of the upper and lower halves of the body. The effect of paralysis of the abdominal muscles on the cardiovascular, respiratory, and gastrointestinal systems is discussed. The technique of the operation is shown by drawings and by an operation on a patient and a cadaver. Postoperative physical therapy and end-results are shown. The photography is excellent. The film should be of particular value to the orthopedist and to those in branches of medicine concerned with paralytic disease.

MEDICAL LITERATURE ABSTRACTS

INTERNAL MEDICINE

Abdominal Epilepsy. E. Brandrup. Nord. med. 61:59-61 (Jan. 8) 1959 (In Danish) [Stockholm].

Attention is called to abdominal epilepsy as a diagnostic possibility in cases of recurrent acute abdominal pain. Two cases from the neurological department in Odense, in a boy, aged 3½ years, and a woman, aged 44, respectively, diagnosed as abdominal epilepsy, are described. Abdominal (or intestinal) epilepsy is diagnosed when abdominal pain is the only, or the most important, manifestation of an attack in epilepsy. The pain is paroxysmal in kind, sets in suddenly and terminates as suddenly, and the picture is reproduced with stereoptic uniformity time and again. In many patients the pain is accompanied by nausea and vomiting. The disease seems to occur more often in children than in adults. Electroencephalography is a valuable aid in diagnosis. An important point in diagnosis is that the patient reacts to antiepileptic treatment.

Rheumatic Heart Disease Associated with Atrial Septal Defect: Clinical and Pathologic Study of 12 Cases of Lutembacher's Syndrome. J. Espino-Vela. Am. Heart J. 57:185-202 (Feb.) 1959 [St. Louis].

This paper deals with 12 patients who had mitral valvular damage in association with wide atrial septal defect (Lutembacher's syndrome). Embryologically, the defect seems to be the result of extensive resorption of the septum primum with faulty development of the septum secundum. Three of the patients had virtually a single auricle. Although other patients were observed who had the characteristic clinical syndrome, the author limited this report to the 11 cases proved at autopsy and the 1 proved at operation. This seems a relatively high number, and yet it is rather surprising that more cases are not seen, since rheumatic heart disease is responsible for 40% of the admissions to the National Institute of Cardiology in Mexico and since the second most frequent congenital cardiac anomaly is atrial septal defect. Thus, it seems strange not to see these 2 entities associated more often. The ages of the 12 patients ranged from 10 to 71 years. There were 8 females and 4 males.

Clinically, the disease was most frequently typical of severe rheumatic heart disease. The clinical features suggestive of the association of rheumatic valvular disease and atrial septal defect were: (1) atypical auscultatory findings of rheumatic mitral stenosis: no presystolic accentuation of the diastolic rumble; (2) the presence of a systolic murmur accompanied by a palpable thrill in the pulmonary area; and (3) cyanosis of slight to moderate degree (not seen in the absence of heart failure). Supportive roentgenologic evidence of this association were the large size of the pulmonary main trunk and its branches, with vigorous pulsations, in association with a mitral or mitral-tricuspid cardiac contour, and slight or absent left auricular enlargement. Finally, electrocardiographic data suggestive of this diagnosis were the presence of right bundle-branch block and commonly qR-type complexes in lead V_1 with concomitant left auricular enlargement ("mitral" P waves).

In only 3 patients was the diagnosis of atrial septal defect readily apparent, while that of rheumatic heart disease was not so obvious. In 2 patients neither one of the 2 conditions was correctly postulated. One of these patients had aortic coarctation, and the other had lived to the age of 71 years with cardiosclerosis and chronic cor pulmonale.

The Treatment of Cardiac Arrest Following Myocardial Infarction. J. G. McGregor and D. E. Newton. U. S. Armed Forces M. J. 10:125-140 (Feb.) 1959 [Washington, D. C.].

Resuscitation was attempted in 5 patients with cardiac arrest secondary to myocardial infarction in Brooke Army Hospital, Fort Sam Houston, San Antonio, Texas. In cardiac resuscitation it is imperative that cardiac compression and pulmonary insufflation be instituted within 4 minutes after cardiac arrest. In the first patient, a 51-year-old man, the resuscitation by thoracotomy, cardiac massage, and electric defibrillation was successful, because it was instituted at the first sign of ventricular fibrillation. This constitutes the 4th reported instance of successful resuscitation of a patient who sustained ventricular fibrillation secondary to myocardial infarction. It is of interest that the only drug used in this patient was procainamide hydrochloride; it was not given during

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The place of publication of the periodicals appears in brackets preceding each abstract.

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the actual resuscitation, but only specifically to prevent the premature beats following defibrillation. This patient is well, except for a moderate angina pectoris. The second patient, a 31-year-old man, died one hour after resuscitation from damage of the central nervous system, probably due to the unnecessary delay in instituting cardiac resuscitation. In the remaining 3 patients the attempt at resuscitation was unsuccessful, because too much valuable time had been lost between cardiac arrest and application of resuscitative measures.

The measures necessary for resuscitation of patients with ventricular fibrillation are not applicable to all patients or to all situations. The condition of the patient should be evaluated; the occurrence of previous myocardial infarctions, the presence of severe systemic disease, the age of the patient, and the minutes elapsed after cardiac arrest should be considered before attempting cardiac resuscitation.

Pulseless Disease (Takayashu's Syndrome). S. S. Misra and S. Prakash. Am. Heart J. 57:177-184 (Feb.) 1959 [St. Louis].

A peculiar syndrome, characterized by absence of pulsations in the carotid and radial arteries, is met with in aortic arch syndromes such as syphilitic aneurysms, rarely in dissecting aneurysms, and also in traumatic injuries of the chest. There is a group of patients in whom there is a primary panarteritis of unknown etiology, and this has been variously described as Takayashu's syndrome or pulseless disease. It is a rare syndrome affecting chiefly young women; hence, it has also been called "young female arteritis." The authors present 3 patients with this rare disease. The first patient, an 18-year-old male Hindu, complained of enlargement of cervical lymph nodes for the last 6 months, anasarca, giddiness, and general weakness for 3 months before admission. Radial, brachial, and carotid pulses were absent on both sides. The patient died, and on autopsy the aorta showed evidence of panarteritis of undetermined etiology. Generalized amyloidosis might have been due to the chronic suppurative cervical lymphadenitis, and the nephrotic syndrome was secondary to the renal amyloidosis. Whether or not there was any correlation between amyloidosis and pulseless disease is difficult to say.

The second patient was a 15-year-old Hindu girl, the youngest patient ever reported to have pulseless disease. Her clinical picture resembled that of the first patient in many respects. In addition to the pulseless condition, she also had cervical lymphadenopathy, which proved to be due to caseating tuberculous adenitis, and a nephrotic syndrome secondary to amyloidosis, which might have been secondary to the caseating tuberculous lymph nodes. The third patient was a 54-year-old Hindu woman, who had chronic progressive obliterative involvement of the radial arteries. A bilateral immature cataract was probably due to the deficient blood supply. Giddiness and numbness and tingling in the left upper limb might be explained as being due to chronic ischemia of the brachiocephalic arteries.

In the first patient no etiological factor could be determined for the panarteritis which resulted in pulseless disease. The second patient had caseating tuberculous cervical adenitis and a strongly positive tuberculin test, which might suggest a tuberculous etiology of the arteritis, as was suggested by Japanese authors. In the third patient an elevated serum cholesterol level and the fact that biopsy of the radial artery showed some atherosclerosis suggested much more advanced atheromatosis in the aorta resulting in obliteration of the pulse. A direct histological examination of the aorta was not possible in the 2 patients who are still alive. Peripheral arterial diseases were excluded in all 3 of the patients by biopsy of the radial artery. A nephrotic syndrome due to amyloidosis, as observed in the first 2 of these 3 patients, has never before been reported in association with pulseless disease.

"Pulseless Disease": Review and Report of Case of Takayashu's Syndrome. J. Fossgreen. Ugesk. læger 121:45-49 (Jan. 8) 1959 (In Danish) [Copenhagen].

The absence of pulse in the cranial part of the body, due to abnormal changes in the great vascular branches originating from the aortic arch, is a symptom which has long been known. More than 100 cases of Takayashu's syndrome or pulseless disease have been published. The disease almost exclusively affects young and middle-aged women. An arteritis is localized to the aorta and the great vessels which leave the aortic arch. The process involves all vascular layers and gradually leads to the obliteration of the lumens of the great branches. The history often reports rheumatic or other infections, and periods of fever are a frequent symptom. The fully developed Takayashu's syndrome is characterized by the absence of pulse in the upper part of the body, trophic changes in the cranium, cerebral symptoms, eye changes, carotid sinus syncope, cardiac symptoms, and development of a collateral circulation; laboratory findings show constantly increased sedimentation reaction. Takayashu's syndrome should be included in differential diagnostic considerations in case of neurological phenomena or disturbances in vision in younger women, especially if the symptoms are vague. Careful palpation of the arteries of the head and arms will give the correct diagnosis. The prognosis is unfavorable. If, however, there is only closure of the subclavian arteries, the outlook can be more optimistic. The patients live between 1 and 20 years after onset of the symptoms. Death is usually due to ischemic brain lesions. No causal therapy is known. Cortisone or prednisone may possibly prevent progression of the inflammatory process. The patient should avoid overexertion, and frequent periods of rest are advantageous. Carotid sinus syncope can be treated with atropine or irradiation of the carotid sinus. Antibiotics are without effect. Detailed report is given of the case of a woman, aged 32 years.

The Diagnosis of Thyroid Disease in Private Practice. J. Marks and R. L. Fulton. Ohio M. J. 55:186-190 (Feb.) 1959 [Columbus].

The authors studied 230 patients in order to ascertain to what extent the 24-hour radio iodine (I^{131}) uptake determination was correlated with the clinical diagnoses of the patients. Determinations of basal metabolic rates and serum cholesterol levels, being available in many of the observed patients, were similarly analyzed. Of the 230 patients, the condition of 174 was diagnosed as euthyroid, of 45 as hypothyroid, and of 11 as hyperthyroid. Of the latter group, 7 patients had Graves's disease, and 4 had toxic nodules. Data indicate that the 24-hour I^{131} uptake determination has a high degree of correspondence with clinical thyroid diagnoses and should be employed whenever possible in helping to establish the status of the thyroid gland. Determination of the basal metabolic rate has been used for many years in the evaluation of thyroid gland function; these studies further established this test as a worthwhile procedure in the study of the thyroid gland. The serum cholesterol determinations performed in this series were inconstant and of questionable value in evaluating the function of the thyroid gland.

While the I^{131} uptake and the basal metabolic rate determinations are helpful tests, they impose a challenge on the clinician in many borderline patients with hypothyroidism and hyperthyroidism. The practicing physician is obliged to hold to his clinical impression at times when the imposing documentation of the scintillation counter or the oxygen consumption curve is at variance with his judgment. The authors believe that neither the 24-hour I^{131} uptake test nor the basal metabolic rate are clearly diagnostic in many borderline cases and that, even after an entire "battery" of tests have been performed, the clinician must still come to a conclusion on clinical grounds.

Intrahepatic Cholestasis. C. M. Leevy. Am. J. Surg. 97:132-136 (Feb.) 1959 [New York].

"Intrahepatic cholestasis," a descriptive term proposed for obstruction to bile outflow incident to a pathological process which originates within the liver (J. A. M. A. 150:1367-1372 [Dec. 6] 1952), may be produced by a variety of medical diseases. According to the initiating clinicopathological process, the author classified his patients with intrahepatic cholestasis into 3 groups, namely, those with functional cholangiolar disease, those with neonatal hepatitis, and those with interlobular bile duct degeneration and atresia. The course in 22 patients with protracted jaundice due to functional cholangiolar disease is described. Bile stasis without morphologic alteration of the parenchymal cell or biliary network occurred during the course of viral hepatitis in 5 of the 22 patients and after the administration of various drugs, such as chlorpromazine, methimazole, methyltestosterone, arsenicals, and sulfonamides, to 17. Usually jaundice rapidly subsided, and complete recovery occurred in 18 of the 22 patients. Jaundice persisted in 4 patients, and subsequent studies showed portal fibrosis in 1 and biliary cirrhosis in 3.

Unfortunately in many patients it is not possible to distinguish intrahepatic cholestasis clearly from extrahepatic biliary obstruction which requires surgical therapy. The history, biochemical liver function tests, liver biopsy, and special laboratory procedures may be helpful in individual patients. Early operative exploration with biopsy and cholangiography is often desirable to eliminate the possibility of an extrahepatic obstruction in patients with progressive jaundice attributed to functional cholangiolar disease, neonatal hepatitis, and atresia of the interlobular bile duct. Surgical intervention in these conditions is poorly tolerated, and an attempt should be made to minimize surgical trauma.

Incidence of Gall Bladder Disease in "Normal" Men. R. S. Wilbur and R. J. Bolt. Gastroenterology 36:251-255 (Feb.) 1959 [Baltimore].

Routine cholecystograms on 1,233 male executives, with an average age of 46.8 years, were performed at the University Hospital in Ann Arbor, Mich., during the last 10 years. These studies on active men in the prime of life have revealed a higher than expected incidence of roentgenologically shown biliary dysfunction. Of these 1,233 "normal" men, 182 showed some evidence of gallbladder abnormality past or present, although they averaged less than 50 years of age. Of these 182 men, 92 had visible stones, 25 had had their gallbladders removed, 20 demonstrated definite evidence of gallbladder disease manifested by nonvisualization of the gallbladder, and 45 exhibited faint visualization of the gallbladder. Of the 92 men with visible stones, 59 were completely asymptomatic; of the remaining 33, two-thirds had only the unreliable symptoms of dyspepsia and epigastric pain. These same symptoms occurred in 43 men out of a group of 488 in whom no organic disease was demonstrable in the gallbladder or elsewhere. It is also interesting to note that 6 of 16 men, previously subjected to cholecystectomy and with no other cause for symptoms, still had indigestion and epigastric pain. Typical "biliary colic" had occurred in only 3 men with visible stones and in 4 men out of the group of 488 with normal cholecystograms.

Even if the incidence rate of gallbladder dysfunction among employed men throughout the United States were a good deal lower than that in this series, the number of active American men with asymptomatic gallstones must be in the millions. The fact that the incidence of gallstones in men rises sharply after the retirement age is reached and that the percentage in women is significantly higher than that in men until the 7th decade clearly illustrates the magnitude of the problem of the "silent gallstone." The authors think that cholecystectomy, in the absence of true biliary colic or jaundice, should not be performed in the hope of relieving vague indigestion or dyspepsia, just because the cholecystogram demonstrates stones.

Intestinal Polyposis Associated with Melanin Spots: Peutz-Jeghers Syndrome. J. Guillard, R. Laumonier, J. Seyer and R. Boulet. Presse méd. 66:2076-2079 (Dec. 25) 1958 (In French) [Paris].

The hereditary nature of intestinal polyposis associated with melanin spots was observed in 10 members belonging to 3 generations of a family. The father of the first generation died, at the age of 56 years, of occlusion of the small intestine, which was attributed to periodic mild episodes of abdominal occlusions. One of the 2 sons in the second generation, at the age of 46 years, had a true Peutz-Jeghers syndrome. Melanin spots were noted on the interior side of the left cheek, on the cornea, and around the eye. Multiple polyps were present in the stomach, and one in the ileum. The patient had had periodic abdominal pain for 6 years, which had intensified recently. Of his 5 children (third generation), the eldest daughter, 19 years of age, who was the starting point of this genealogical investigation, had a true Peutz-Jeghers syndrome. A 17-year-old son had diffuse melanin spots of the oral mucosa and lips, and another son died, at the age of 8 years, of an ileoileal invagination.

Both father and daughter were operated on for multiple polyposis and had a satisfactory recovery. The daughter had had intense abdominal pain related to occlusion, which had been accompanied by vomiting for 3 years before the operation. She had polyps in the stomach, and there was a double invagination of, and several polyps in, the jejunum. Microscopic examination of the specimens obtained by aspiration biopsy of the stomach in both patients revealed proliferation of benign polyps, accompanied by retrogression of the mucosa of the fundus of the stomach. The histophotometric test disclosed that polyps in both patients were benign lesions, exhibiting mild nuclear activity.

Pernicious Anemia: A Disease of the Senile and Presenile Ages. G. Benedetti and P. Ulivieri. Gior. gerontol. 6:965-970 (Dec.) 1958 (In Italian) [Florence, Italy].

Recent statistical studies show that pernicious anemia, up to recent times considered a disease of middle age, is frequent in people of the senile and presenile age groups. Pernicious anemia, at least in its beginning phase, is a disease of the digestive apparatus, and the study of its occurrence in senile patients may be revealing insofar as these patients are more liable to suffer episodes of protein and vitamin deficiency as well as alterations of the gastrointestinal functions. The authors observed 11 patients, 52 to 77 years of age, with pernicious anemia and report on the clinical symptoms and on the treatment followed in curing these patients. Sex did not account for any substantial difference in the frequency of the disease and in the clinical manifestations. Most of the patients presented clear signs of bone marrow hypoplasia, and the patients most advanced in age had almost an aplasia. "Associated" or "masked" pernicious anemia was present in most of the patients, who presented also a cardiocirculatory decompensation syndrome. The study of gastric secretion showed that all patients, except one, showed signs of histamine-resistant achylia. Disturbances of the glandular system, mainly hypothyroidism, were present in the patients most advanced in age, and especially in those who had not responded to hepatotherapy.

Half of the patients most advanced in age before the occurrence of the symptoms of anemia had been treated with antibiotics, given in large doses and for long periods of time, on account of pneumonia, bronchitis, or bronchiectasis. In these patients hepatotherapy and vitamin B_{12} had had no effect, and the patients were subjected to blood transfusions of 100 to 150 cc. each time. The amount of blood given at each transfusion was kept low in order not to overcharge the circulation, since most of the patients had cardiac decompensation. The blood transfusions had a good and immediately stimulating effect—the appetite returned, atrophic manifestations of the tongue and gastrointestinal disturbances disappeared, and the condition of the bone marrow improved. The transfusions were always combined with vitamin B_{12} given parenterally, iron preparations given by mouth or intravenously, vitamin B complex, vitamin B_4, and large doses of cocarboxylase given intravenously. The results obtained with this therapy were good in most of the patients and were very good in the remainder.

SURGERY

Clinical and Statistical Considerations on 1,000 Cases of Malignant Tumors of the Breast.

F. de Bernardis. Acta chir. italica 14:647-684 (Sept.-Oct.) 1958 (In Italian) [Padua, Italy].

A clinical and statistical study on 1,000 patients with malignant tumors of the breast observed in the surgery clinic of the University of Padua from November, 1939, to December, 1956, is presented. Eleven patients were male, and the others were female; most of them were in the 5th or 6th decade of life. Epithelial tumor, especially pure adenocarcinoma, was the most frequent form observed. The tumor was still in the first or second stage in most of the patients. Eighty-one women had undergone previous operation for benign tumor of the breast. In 48 patients a definite relationship between the tumor and a trauma in the genital system was found. Metastasis was present in 56% of the patients operated on. Roentgenotherapy was beneficial, especially when used immediately after radical operation.

The general therapeutic procedure was as follows: Early radical mastectomy (Halsted technique) was performed whenever possible; at least one cycle of roentgenotherapy was given as soon as the operative wound had healed; large doses of androgen hormones were administered to the patients who presented metastasis even if the metastasis was localized or if it had been removed surgically. Patients on whom it was not possible to operate were given roentgenotherapy as soon as possible and were injected with large doses of cytostatic, chemotherapeutic, antineoplastic substances; adrenalectomy and hypophysectomy were performed when acceptable to the patients. The results of the treatment could be followed in 980 patients. Two years after the initial treatment 70% of the patients were still alive, and 5 years after 42% were alive. Later observations showed that 39% of the patients were still alive, but 61% had died.

The Direct Risk of Cholecystectomy: Analysis of 1,458 Operations.

M. W. van Weel. Nederl. tijdschr. geneesk. 103:6-11 (Jan. 3) 1959 (In Dutch) [Amsterdam].

The author cites evidence indicating that it is erroneous to believe that cholelithiasis which causes no symptoms is "innocent." Any gallstone condition is potentially dangerous, so that, if it were not for the risk of the operation, it would be advisable to remove the gallbladder whenever there is a definite diagnosis of gallstones. To ascertain the risk, the author analyzed a total of 1,458 gallbladder operations, of which 1,217 were interval operations and 241 were "hot" cholecystectomies, that is, they were performed during acute cholecystitis. Interval operations were performed on 987 women and on 230 men, the ratio of women to men being 4.3:1; operations during the acute stage, however, were performed on 171 women and on 70 men (ratio of 2.2:1). The majority of patients in both groups were over 50 years of age, but whereas interval operations were most frequent in patients between 50 and 59 years, operations for acute cholecystitis were most frequent among those between 60 and 69 years of age.

A tabulation of findings during interval operations shows that cholelithiasis without infection existed in 49.8% of the women and in 26.1% of the men and cholecystitis with stones in 48.4% of the women and in 70% of the men. The choledochus was explored in 53.4% of the women and in 63% of the men; and stones were found during choledochal exploration in 38.4% of the women and in 57.3% of the men. There was no great difference between the sexes with regard to the incidence of pancreatitis and carcinoma of the gallbladder. Complications were somewhat more frequent and more severe after operations during acute processes than after interval operations. The surgical mortality has been reduced to very low levels, being 0.25 and 2.5%, respectively, for 1,217 interval operations and 241 "hot" operations. Thorough diagnostic studies and careful selection of patients are important. Furthermore, the operation should be performed at the earliest possible stage of the disease. In patients with acute cholecystitis the author recommends immediate cholecystectomy.

Iliofemoropopliteal Arterial Reconstructions for Arteriosclerosis Obliterans: Factors Influencing Late Patency.

R. Warren and J. L. Villavicencio. New England J. Med. 260:255-263 (Feb. 5) 1959 [Boston].

The authors report on 70 patients with obliterative arteriosclerosis, on whom iliofemoropopliteal arterial reconstructions were performed at the West Roxbury Veterans Administration Hospital and the Peter Bent Brigham Hospital in Boston between 1953 and 1956. The upper ends of the arterial reconstructions were below the origin of the external iliac artery. Three different methods of reconstruction were employed, namely, arterial homografts in 36 patients, venous autografts in 13, and thromboendarterectomy in 21. The incidence of patency for at least one year after the operation was 9% for arterial homografts, 18% for venous autografts, and 55% for thromboendarterectomy. The best results in this series and the best results that have been reported to date by other workers, in terms of long-term patency of reconstructed iliofemoral segments, have been those of thromboendarterectomized segments; these were operated on by the intraluminal stripping technique, and the patients were discharged from the hospital with the circulation restored.

Roentgenologic studies and pathological studies by biopsy of reconstructed segments or by amputation showed that the thromboendarterectomized segments underwent a marked reaction of fibrosis during the first 6 months after the surgical intervention. If they survived this period, further reaction did not take place, and relative long-term patency could be expected. In the venous autografts, a similar susceptibility was observed during the first 6 months after the surgical intervention, presumably resulting from a variety of factors, such as constriction of anastomosis, irregularity of the segment itself, taut adventitial bands, and external hematomas. If the grafts did not close because of these factors in the first 6 months, relative long-term patency could be expected. Progressive lesions occurred postoperatively in 50% of the arterial reconstructions performed with the aid of arterial homografts. These lesions consisted of mural thrombus, rapid degeneration with calcification, aneurysm, and late degeneration similar to that resulting from arteriosclerosis. Later closures occurred in these segments, and in others that showed no lesions, to the extent that no security against closure was gained with the passage of time.

There was no relation of the level of serum cholesterol or the incidence of other obliterative arteriosclerotic lesions to the lesions occurring in the reconstructed segments or the incidence of closure of reconstructions. Twenty per cent of the extremities in which closure of the arterial reconstructions occurred became worse, and of these about 50% required amputation, which probably would not have been necessary if the reconstruction had not been attempted. It is emphasized that the implications concerning long-term patency drawn from this study of arterial reconstructions, the upper ends of which were situated not higher than the external iliac artery, are not applicable to reconstructions of the aorta and common iliac arteries, which have a higher incidence of late patency.

Dermoid and Epidermoid Tumors in the Central Nervous System of Adults. C. S. MacCarty, M. E. Leavens, J. G. Love and J. W. Kernohan. Surg. Gynec. & Obst. 108:191-198 (Feb.) 1959 [Chicago].

The authors reviewed the records of patients with epidermoid and dermoid tumors of the central nervous system observed at the Mayo Clinic up to and including 1955. They define epidermoid tumors as neoplasms of congenital origin comprised of the outer layer of the epidermis, squamous epithelium, and desquamated epithelium—and occasionally an outer layer of fibrous and connective tissue. The stratified squamous epithelial layer contains keratohyaline granules. Dermoid tumors are teratomas composed primarily of skin and its derivatives. They differ from the more complex teratomas, which usually contain residues of tissue representing all 3 germ layers. Both epidermoid and dermoid tumors are considered to be congenital in origin. The dermoid tumors are the most frequently seen in conjunction with a dermal sinus except in adults and appear symptomatically earlier in life than the epidermoid tumors.

The total of 77 patients included 45 with epidermoid and 32 with dermoid tumors, but this report is concerned chiefly with the 63 adult patients (over 15 years of age), 44 of whom had epidermoid and 19 dermoid tumors. Of the 44 epidermoid tumors, 24 were located intracranially, 14 in the skull, 3 encroached on the orbit as well as extending intracranially, and 3 were intraspinal in location. Twenty-one of 24 intracranial epidermoid tumors were treated surgically; 11 were removed completely, 8 were incompletely removed, and in 2 it was not known whether removal was complete or incomplete. There were 4 hospital deaths. Of the 17 patients who survived operation, 1 died in 4 months. Follow-up data on 8 patients an average of 7.3 years after operation show that 2 have recurrences and 6 do not. The 14 intradiploic epidermoid tumors were removed without a death, and only 1 tumor recurred. Three intraorbital tumors were successfully removed. The 3 adult patients with spinal epidermoid tumors survived.

The 19 dermoid tumors were located as follows: intracranial (9), intradiploic (4), intraorbital (1), and intraspinal (5). Six of the 9 intracranial dermoid tumors were supratentorial. All 6 patients with supratentorial tumors were operated on, but the tumor of only 1 was removed completely. The latter patient was alive 18 years and 5 months later, but was still having occasional seizures. There were 2 hospital deaths in the group. One patient was alive and well 7 years after incomplete resection of the tumor. Another was alive and well 16 years after operation. The 6th patient was not traced. All 3 patients with infratentorial tumors were successfully operated on and are alive without recurrences. The 4 adults with intradiploic dermoid tumors had their tumors successfully removed. In the one patient with an intraorbital dermoid tumor, the tumor was removed except for a small piece of capsule attached to the globe. The patient had survived 5 years and 10 months at time of follow-up examination. Of 5 patients with intraspinal dermoid tumors, 3 had intradural intramedullary tumors of the conus and filum; 1 had an intradural extramedullary tumor of the cauda equina; 1 had a low lumbar caudal tumor with a spina bifida. Of the 3 patients with intramedullary tumors of the conus, 1 had complete removal of the tumor and 2 had incomplete removal. One patient with an intradural extramedullary tumor of the cauda equina had complete removal with sacrifice of adherent nerve roots. One patient had a dermoid tumor weighing 670 Gm. and associated spina bifida occulta; this dermoid was completely removed. In patients with intramedullary conus lesions, the postoperative management of functions of bladder and intestine presented difficulties.

Congenital anomalies were associated with 3 of the epidermoid tumors and with 50% of the dermoid tumors. These anomalies included anomalous fusion of vertebrae, cyst of the septum pellucidum, presence of dermal sinuses, harelip, pilonidal sinus, cysts under the occipital portion of the scalp at birth, cervical rib, meningocele, and spina bifida. A surprising number of patients with both groups of tumors involving the intracranial, intraorbital, or intradiploic areas had mental symptoms. There were 4 operative deaths in 41 patients with epidermoid tumors and 3 operative deaths in 32 patients with dermoid tumors. Long survival may occur in these cases, even though the tumor is incompletely removed.

Prednisone in Chronic Lymphoedema of the Legs. J. Calnan and S. C. Truelove. Brit. J. Plast. Surg. 11:329-334 (Jan.) 1959 [Edinburgh].

Chronic edema of the legs, when not due to cardiac or renal disease, may be due to one of several causes. In tropical elephantiasis, the lymphatics are blocked by Filaria bancrofti. In tuberculosis, an analogous blocking of lymphatic drainage may occur through scarring. A large venous thrombosis may leave a chronic lymphedema as one of its sequels. A carcinoma may infiltrate the main lymphatics of a limb. Deep x-ray therapy may cause fibrosis which, in turn, produces lymphatic obstruction. In some patients the condition follows accidental trauma or surgery. Yet, when all these known causes are excluded, there remain many patients with chronic lymphedema of the legs. The most common variety is known as lymphedema praecox, because it develops in adolescence. The condition is chronic and persists throughout life, usually becoming progressively more severe. In some families the condition runs through several generations, and it is then known as Milroy's disease. One of the striking features of chronic lymphedema of unknown etiology is its predilection for the female, at least 10 times as many women as men being affected. Another feature is that the lymphatics are not necessarily blocked.

Treatment is unsatisfactory. It is impracticable to confine otherwise healthy patients to bed; yet, while they remain ambulant, the disease shows an inexorable progression. In due course the disability becomes so severe that surgical maneuvers are resorted to in an attempt to diminish it. Excision of the deep fascia can be performed in order to encourage anastomosis between superficial and deep lymphatics. This operation is of little permanent value. It has now been largely abandoned in favor of excision of the affected skin and subcutaneous tissue, which is replaced by skin grafts. Various other surgical approaches have been made, but no method gives permanently satisfactory results. During recent years there have been reports about beneficial effects from cortisone or its analogues in chronic lymphedema. The authors used prednisone in treating 5 patients with lymphedema.

The results suggest that prednisone is not a treatment of general application in lymphedema. There is usually lessening of the edema (4 of 5 cases in the present series) when a full therapeutic dose is used, but the improvement is lost on reducing the prednisone to a level which would be safe for continuous maintenance treatment. Nevertheless, the authors regard the lessening of edema as of great theoretical interest. It seems improbable that there would be any such effect if the condition were due to purely mechanical factors; in other words, the abnormal limbs are in a dynamic state. Chronic lymphedema differs from other types of chronic edema in that the limb does not pit on pressure, but a similar nonpitting edema can occur in congestive heart failure if the condition persists long enough for fibrotic changes to supervene. Prednisone has been known to cause disappearance of the ascitic fluid, an effect which has been attributed to inhibition of aldosterone secretion. Similarly prednisone has been shown to reduce the edema of congestive heart failure. It seems important to look for evidence of a disturbance of water and electrolyte metabolism with special reference to hormonal influences. The effect of prednisone may possibly be due to the inhibitory effect that it has on the patient's adrenal glands.

The Natural History of Esophageal Varices: A Study **of 115 Cirrhotic Patients in Whom Varices Were Diagnosed Prior to Bleeding.** L. A. Baker, C. Smith and G. Lieberman. Am. J. Med. 26:228-237 (Feb.) 1959 [New York].

In 115 patients with cirrhosis of the liver, the diagnosis of esophageal varices was established, without a history of hemorrhage, by esophagoscopy performed at the Veterans Administration Hospital in Hines, Ill. The clinical course of these patients was uninterrupted by surgical intervention, and the patients were followed for intervals varying from 1 to 6 years and for an average of 3.3 years. Forty-one of the 115 patients were living and 74 were dead at the time the data were assembled. Bleeding from esophageal varices had occurred in 33 (28.6%). There were 20 (17.3%) who died of exsanguination, 31 (26%) who died of hepatic failure, and 23 (20%) whose deaths were due to unrelated causes. Eleven patients (9.5%) died of exsanguination during the first episode of bleeding. About 90% of the deaths from liver disease occurred within 2 years after varices were diagnosed.

Knowledge of these aspects of the natural course of the disease in such patients is necessary before it is possible to know what must be accomplished by *routine* prophylactic surgical shunt procedures, an admittedly radical form of prevention, in order to establish the validity of this surgical policy. Inasmuch as the essential difference in the objective of this policy, over the practice of reserving surgical intervention for those patients who have sustained a hemorrhage, is directed toward preventing death from the first hemorrhage, this becomes the most important datum in this study. It is estimated that by the time all 115 patients are dead, between 10 and 15% will have died of first hemorrhage. This, then, is the ultimate possible goal of achievement against which must be balanced the mortality rate, failures, and complications of routine prophylactic decompression surgery.

The unexpectedly long survival of some patients with esophagoscopically established varices, the relatively small proportion of suitable cases, the incidence of death due to causes other than hemorrhage from varices, and the substantial operative and preoperative risks indicate that at present routine prophylactic decompression surgery does not seem to offer any definite advantages to the patient. If further experience on a large scale reveals (1) criteria for determining those patients most likely to bleed, (2) that the over-all surgical mortality rate can be lowered to about 5%, (3) that surgical treatment prevents hemorrhages in nearly all patients over a period of years, or (4) if it is shown that there are serious remote untoward effects of hemorrhage on the course of the disease, this conclusion may well be unwarranted.

Pulmonic Stenosis with Intact Interventricular Septum. H. L. Gadboys, R. H. Kyle and R. P. Glover. Surg. Gynec. & Obst. 108:175-181 (Feb.) 1959 [Chicago].

Surgeons are coming to the point of deciding whether all cardiac surgery should be done by open-heart techniques, or whether certain intracardiac procedures will continue to be best done without the complexity of a direct visual approach. In pulmonic stenosis with intact interventricular septum the obstruction is generally valvular, and, unlike the indurated tissues of rheumatic valvular stenosis, the involved pulmonic valve tends to remain pliable for many years. Consistently excellent results should be attainable in these patients. During the past 7 years the authors operated on patients with valvular pulmonic stenosis with intact interventricular septum by a modified Brock transventricular valvotomy. A smaller group with intact septum required infundibular resection. There were in all 46 patients (19 males and 27 females), who ranged in age from 2 to 42 years, with an average age at operation of 13 years. Thirty-four patients were subjected to transventricular valvotomy only, 6 had infundibular resection, and 6 had both valvotomy and infundibular resection. The diagnosis in all but 3 patients was ascertained by catheterization.

There were no operative deaths in patients treated by closed valvotomy and/or infundibular resection. One patient with infundibular and valvular stenosis died 8 months after the operation was performed. The average peak systolic pressure gradient was 102 mm. Hg preoperatively. Operative pressure studies showed a drop from 97 to 44 mm. Hg for the series. Twenty-one patients were recatheterized, an average of 3½ years after the operation, and the gradient for the series has further decreased to 33 mm. Hg. The mean postoperative gradient for the patients with valvular stenosis alone was 28 mm. Hg. Clinical results were good to excellent in 86% of the patients.

The authors feel that in the rapidly progressing field of cardiac surgery there is little room for dogmatic statements about specific surgical methods. The possibility of overlooking an interventricular septal defect and the sometimes uncertain results with infundibular resection led them to elect direct visual methods for the correction of infundibular stenosis in any combination. They are not yet ready, however, to disown the simple, safe, Brock-type valvotomy as the treatment of choice for pure valvular pulmonic stenosis.

Biopsy of the Apex of the Axilla in Carcinoma of the Breast. C. D. Haagensen and S. J. Obeid. Ann. Surg. 140:149-161 (Feb.) 1959 [Philadelphia].

Over a period of 20 years the authors have made an effort to learn to select patients with carcinoma of the breast in whom the diseased tissue cannot be removed by the classical Halsted radical mastectomy. They found that their clinical criteria of operability were not strict enough. Impressed by Handley's observation of the frequency of occult metastases in the internal mammary nodes, and by Dahl-Iversen's finding of occult metastases in the supraclavicular nodes, they began to remove these lymph node groups as a preliminary biopsy procedure, for the purpose of ascertaining the presence of occult metastases at the periphery of the regional lymph node filter. They tested but finally abandoned biopsy dissection of the supraclavicular region, because they learned that the absence of metastases in this area does not preclude their presence in the nearby subclavicular nodes at the apex of the axilla. Their experience indicated that metastases in the apexes of axillary nodes, which constitute the final barrier in the axillary portion of the regional lymph node filter, mean incurability by radical mastectomy.

Biopsy of the apex of the axilla, which the authors substituted for supraclavicular biopsy in their triple biopsy procedure, removes the so-called subclavicular group of lymph nodes. In anatomic terms this means removal of the areolar and fatty tissue, together with the contained lymph nodes, from a small pyramidal area at the apex of the axilla. The cephalad plane of the pyramid is the axillary vein. Its dorsal plane is the chest wall in the vicinity of the first rib. Its ventral plane is the dense tough layer of the deep axillary fascia which spans the apex of the axilla beneath the pectoralis major muscle. The base of the pyramid faces laterally, and is defined by the thoracoacromial vessels. Its apex is the point at which the axillary vein passes beneath the tendon of the subclavius muscle and the clavicle. In terms of surface anatomy this pyramidal area lies just caudad to the middle third of the clavicle. The complete triple biopsy, which the authors employ as a preliminary operative procedure, consists at present of the 3 following steps: (1) biopsy of the primary tumor to establish the presence of carcinoma; (2) biopsy of tissues in the first, second, and third interspaces along the internal mammary lymphatic route; and (3) biopsy of tissues at the apex of the axilla along the axillary-supraclavicular lymphatic route.

Biopsy of the primary tumor is done through a 3-cm. or 4-cm. incision. A small wedge is excised for frozen section. The whole tumor is excised for biopsy only if it is less than 1 cm. in diameter. If carcinoma has been proved by frozen section, the biopsy wound is closed with a running suture. It is then sealed with a patch of rubber dam cemented in place with dermatone cement. This is important when another biopsy or mastectomy is to follow. Serum and blood containing carcinoma cells ooze from any biopsy wound unless it is sealed off in this way, and these cells may be implanted in another wound. The internal mammary biopsy is next performed. Instruments, drapes, gowns, and gloves are changed, and the skin is prepared anew, to avoid the possibility of transplanting carcinoma from the first biopsy wound to the second. For the third biopsy, that of the apex of the axilla, instruments, drapes, gowns, and gloves are again changed. Data obtained for the first 100 patients, on whom the described triple biopsy was performed, are tabulated, and illustrating case histories are presented. Indications for the performance of biopsy of the apex of the axilla are outlined on the basis of experience in the first 100 cases.

Hepatic Lobectomy. A. Brunschwig. Am. J. Surg. 97:148-150 (Feb.) 1959 [New York].

Of 75 patients undergoing excisional procedures on the liver for neoplasms of various types, 20 had a right hepatic lobectomy and 14 had a left hepatic lobectomy. Fourteen of the 20 patients had a simple right hepatic lobectomy, and 6 had a complex right hepatic lobectomy, i. e., right hepatic lobectomy and, in addition, partial pancreatoduodenectomy, or partial left hepatic lobectomy, or right colectomy. Of the 14 patients undergoing simple right hepatic lobectomy, 2 had massive angioma, 5 had primary hepatic malignant hepatoma, and 7 had metastatic carcinoma from previously resected primary lesions (6 in the colon and 1 in the uterus). Both patients with angioma were living and well 7 and 6 years after the lobectomy. Of the 5 patients with primary malignant hepatoma, 2 died after the operation, 1 lived for 2 years and died of recurrences, and 2 patients were living and well, each 6 years after the operation. Of the 7 patients with metastatic carcinoma, 3 died after the lobectomy, and the other 4 who lived up to 14 months obtained various degrees of palliation, mainly in the form of pain relief. All 6 patients undergoing complex right hepatic lobectomy had carcinoma of the gallbladder invading the porta hepatis and upper margin of the head of the pancreas; 5 of them died after the operation, and the 6th patient was living but had recurrences.

Of the 14 patients undergoing left hepatic lobectomy, 2 had a left hepatic lobectomy in conjunction with radical gastrectomy for cancer of the stomach. One of these lived for more than 17 years, and the other lived 1 year. In 2 patients left hepatic lobectomy was performed in conjunction with resection of gastric stumps and loops of jejunum for recurrent cancer of the stomach; both patients survived about 6 months. Eight patients underwent left hepatic lobectomy for metastases from cancer of the colon, uterus, and breast. There were 2 operative deaths, and survival varied from 6 to 23 months in 6 patients. One patient with carcinoma of the bile duct lived 18 months, and one with primary angiosarcoma was living and well 9 months after the lobectomy.

Malignant Lymphomas of the Gastrointestinal Tract. J. W. Grazer Jr. Surg. Gynec. & Obst. 108: 182-190 (Feb.) 1959 [Chicago].

This report is concerned with malignant lymphomas of the gastrointestinal tract seen at Duke Hospital, Durham, N. C., between 1930 and 1952. The record library lists were checked with the autopsy reports to include any localized lymphomas that were not diagnosed clinically. Each case history was evaluated, and surviving patients were asked to return for follow-up examination. If the patient failed to return, a questionnaire was sent to both the patient and the referring physician. All 31 patients whose records were found in the files were traced for evaluation of 5-year or longer follow-up results. The 31 patients included 8 with reticulum-cell sarcomas, 9 with lymphoblastic lymphosarcomas, 12 with lymphocytic lymphosarcomas, and 2 with mixed types. Patients with Hodgkin's disease or with giant follicular lymphoma localized to the gastrointestinal tract were not found in this group.

At its inception the lymphoma is located submucosally and may grow either as a polypoid mass or as a diffuse infiltrating lesion beneath the mucous membrane. The submucosal extension makes it very difficult for the surgeon to define the limits of the tumor. This explains the cases in which tumor tissue is found at the line of resection after supposedly adequate removal.

Eighteen of the 31 malignant lymphomas were in the stomach. The symptomatology was not characteristic, but an ulcer-like syndrome was seen frequently. Sixteen of the 18 patients had lost weight exceeding 10 lb. (4.5 kg.), 15 had epigastric burning pains or aches, and 11 had nausea and vomiting. A mass was palpated in 8, and 6 had had hematemesis or melena. In general, the over-all clinical appearance of these patients was much better than that of patients with carcinoma of the same extent. A palpable mass, while indicating a large tumor, does not preclude a cure, since 2 patients with large masses are still alive 6 and 26 years after resection. All 18 patients with gastric lesions underwent exploratory laparotomy. Resective surgery proved impossible in 7 of these patients. Nine subtotal resections were done with the hope of cure, and 2 additional patients had resections for palliation. Of the 9 patients on whom resection was performed for cure, 7 lived for more than 5 years. Two of the patients with "curative" resections died 7 months and 9 months after surgery despite radiation therapy, whereas in comparison the 2 with palliative resections survived 2 months and 2 years respectively. External radiation was the primary means of therapy in 6 of the 7 patients considered to have inoperable lesions. While 4 of the 6 obtained some palliation, all 6 were dead within 12 months. Nitrogen mustard was given to 2 patients with rapidly growing nonresectable lesions, but no real improvement was noted even though bone marrow depression indicated a good therapeutic level of the drug.

The duration of symptoms in the 11 patients in whom the malignant lymphoma was in the small intestine was considerably shorter than in the patients with gastric lymphomas. Only one patient had symptoms for as long as 2 years. The early symptoms consisted mainly of cramping epigastric and midabdominal pain associated with general malaise. The diagnosis was established only after abdominal exploration. One patient died within one month after an enteroenterostomy. Of the 10 patients who underwent resections, 3 lived 5 years or longer and are still alive from 6 to 22 years after operation. One elderly woman died 3 years and 4 months postoperatively of a coronary occlusion. The remaining 6 patients died within 2 years, 4 surviving for only 2 months after surgery. Five patients received roentgen-ray irradiation after surgery, but palliation of 6 to 8 months' duration was achieved in only 2. Four patients were given triethylene melamine (TEM) to slow their rapidly progressive disease. No beneficial effect was detected.

Two of the lymphomas were limited to the colon. Both patients presented themselves with symptoms of intestinal obstruction with a palpable mass. A 6-year-old boy died 2 months after a colectomy of the ascending colon was performed. A lesion of the transverse colon was seen in a 51-year-old man, and at operation the transverse colon was perforated. Despite a wide resection he succumbed with peritonitis. Surgical excision is the primary treatment in patients with malignant lymphoma of the gastrointestinal tract.

Liver Decompression by Drainage of the Common Bile Duct in Subacute and Chronic Jaundice: Report of Seventy-Three Cases with Hepatitis or Concomitant Biliary Duct Infection as Cause. A. A. Strauss, S. F. Strauss, A. H. Schwartz and others. Am. J. Surg. 97:137-140 (Feb.) 1959 [New York].

Surgical decompression of the common bile duct for relief of chronic jaundice resulting from acute and subacute hepatitis was performed on 73 patients. Of these, 31 had viral hepatitis, and 42 had subacute or chronic hepatitis due primarily to an infection of the common bile duct. A biliary fistula was formed by introducing a catheter into the hilus of the liver proximal to the atresia. For 1 or 2 days the fistula would yield only clear, watery fluid secreted from the ductal epithelium, showing that the liver cells could not function due to the increased intraductal pressure. When the pressure was relieved after 24 to 48 hours of decompression, the bile drained from the common bile duct assumed its normal color. All operations were performed with the aid of local anesthesia.

All patients with viral hepatitis had had jaundice for 9 weeks or longer and were in poor or critical condition; several were stuporous. Four of the 31 patients did not obtain relief of jaundice and died several months later. The other 27 patients completely recovered. Although these patients might have recovered without surgical drainage of the common bile duct, it is believed that the recovery rate in this series could not have been attained by medical therapy alone. All these patients had had an adequate trial period of medical treatment. In the group of 42 patients with an inflammatory process in the distal portion of the common bile duct and in the duodenal papilla, the ducts were thickened and infiltrated and contained a large amount of serous to seropurulent exudate. On probing the ducts, there was difficulty in passing through the papilla. Patients with this type of disease, as a rule, recover much more quickly from their jaundice and hepatitis than those who primarily have hepatitis. In some of the long-standing cases (3 to 6 months) the patients pass postoperatively into a phase of acute hepatitis that clinically resembles acute yellow atrophy of the liver. This happened in 2 of the 42 patients who died and in whom the autopsy finding was an acute necrosis of the liver with acute yellow atrophy. The other 40 patients recovered uneventfully.

GYNECOLOGY & OBSTETRICS

The Value of a Prepared Culture Medium in the Diagnosis of Trichomonas Vaginalis. W. H. Wolinska. Am. J. Obst. & Gynec. 77:306-308 (Feb.) 1959 [St. Louis].

The author employed 3 methods in searching for the presence of Trichomonas vaginalis in 203 consecutive patients from the special gynecologic service of the Strang Clinic at the Memorial Center for Cancer and Allied Diseases in New York. Fluid from the posterior vaginal fornix was obtained by means of two cotton-tipped applicators. One applicator was immersed in 1 cc. of warm isotonic sodium chloride solution for hanging-drop studies. The other applicator was immersed in 10 cc. of previously prepared culture medium. Routine cervical and vaginal smears on each patient were stained by the Papanicolaou method.

A trypticase culture medium was recently developed and is available as a prepared powdered medium known as Trichosel. It contains trypticase, cysteine hydrochloride, maltose, agar, methylene blue, and chloramphenicol. Twenty-three and six-tenths grams of this dehydrated material is dissolved in 950 cc. of distilled water, mixed thoroughly, heated, stirred, and boiled for about one minute. Nine and one-half cubic centimeters of the solution is dispensed into screw-top test tubes and autoclaved at 12-lb. pressure for about 15 minutes. Tubes are stored at room temperature. Just before it is used, 0.5 cc. of human serum, adjusted to pH 6, is added aseptically to each tube. Commercially available plasma, although having a pH of 7, may be used in lieu of serum. Cultures taken in the previously described manner do not require immediate incubation, but may be left at room temperature for several hours. Incubation overnight at 35 to 37 C is necessary to stimulate growth. The reading is done on wet smears in vitro. The recognition of Trichomonas organisms is based on the motility of the protozoa and the mobility of the undulating membrane. The presence of nonmotile organisms is not considered as a positive result. The highest number of motile parasites is usually found in cultures incubated 24 hours.

The other 2 methods, the hanging-drop technique and the cytological smear method, are also briefly outlined. Although these methods give a fairly accurate estimation of the presence of T. vaginalis, the Trichosel culture medium provides by far the most accurate method of detecting the presence of the parasite. The ease with which the vaginal secretion may be cultured under ordinary laboratory conditions renders this method eminently desirable for widespread use.

Transverse Vaginal Septum: Report of Three Cases with Method of Treatment. F. S. Rogers. M. Ann. District of Columbia 28:79-81 and 114 (Feb.) 1959 [Washington, D. C.].

Although there have been many reports about partial or complete absence of the vagina, the more common anomaly of transverse vaginal septum has received little notice. Clinically, transverse vaginal septum presents as a membrane of variable thickness, especially at its junction with the vaginal wall, where considerable fibrosis may be present. Openings are usually present in the septum and may be single or multiple, varying in size and location, but sufficient to allow for normal menstrual flow. The 3 patients presented here, ranging in age from 20 to 26 years, all had normal menses. One was married and complained of dyspareunia. All 3 patients were successfully treated by surgical excision and vaginal plastic procedure, but in each instance this was followed by the use of a vaginal dilator, designed to minimize scar formation and to prevent constriction of the operative area.

When excessive fibrosis is present, bleeding is difficult to control, proper approximation of the mucosal edges is often impossible, and there is the danger of cicatricial contracture. The author believes that the good therapeutic results obtained in the cases presented have been due in large measure to the proper use of the vaginal dilator postoperatively to prevent excessive scar formation and cicatricial contractures.

Diagnosis of Trichomonas Vaginalis Vaginitis. T. A. Burgh, C. W. Rees and L. Reardon. Am. J. Obst. & Gynec. 77:309-313 (Feb.) 1959 [St. Louis].

Studies were made on 1,848 female employees of the National Institutes of Health who participated in one or more of 3 annual vaginal cytology surveys. More detailed studies were made on 97 volunteers who were found to have trichomoniasis in the first survey or who were referred to the Trichomonas project because of vaginal discharge or itching. The patients were instructed not to douche or use vaginal medication for 24 to 48 hours before examination. The vaginal secretion for the Papanicolaou smear, wet smear, and culture was obtained by means of a glass pipette with a rubber bulb. For the Papanicolaou smear the secretion was expelled onto a glass slide, spread, and immersed immediately in equal parts of ether and absolute ethyl alcohol. The fixed smear was stained by Papanicolaou's method, and the slide examined. While the material for a wet smear is usually obtained by means of a cotton swab, in this study a small drop of vaginal secretion was expelled onto a dry glass slide (from the pipette used to make the Papanicolaou smear), a drop of isotonic sodium chloride solution added, and the preparation was then examined immediately for the presence of the characteristically motile trichomonads.

After these smears were prepared, the vaginal pipette was rinsed out in a tube of trypticase-liver-serum medium. The medium used in the culture studies was a combination of 2 nutrient fluids with the addition of horse serum, a reducing agent, and antibiotics. The composition of the culture medium is described, and the results obtained with it and the smear methods are compared. Diagnosis by means of the Papanicolaou smear was the least sensitive and specific method in that fewer than half of the patients from whom Trichomonas vaginalis was cultured were reported to have trichomoniasis. While the wet smear was the simplest, the culture method often demonstrated the infection when the wet smear was negative. The culture method was more convenient than the wet-smear method in that the microscopic examination did not have to be done immediately. It made little difference whether the patient had douched or recently used vaginal medication; if viable parasites were present, the culture method usually demonstrated them. Examination of vaginal cultures at 48 and 96 hours demonstrated nearly all cases of infection. About 8% of such cultures from infected women were negative, however. A single negative examination, therefore, should not rule out trichomoniasis in a woman with appropriate clinical findings.

The following procedure is recommended for the diagnosis of vaginal trichomoniasis: 1. Obtain a sample of vaginal secretion by means of either a cotton-tipped applicator or a vaginal pipette. 2. Inoculate the secretion into a tube of culture medium by inserting the applicator into the tube or rinsing out the pipette in the medium. 3. Add sodium thioglycollate and antibiotics. 4. Incubate the culture at 37 C and examine a drop of sediment for motile organisms with the compound microscope, preferably at 24-hour intervals but at least at 48 and 96 hours. 5. If a preliminary examination is desired when symptoms are acute, the material in the cotton-tipped applicator can be removed from the culture tube and used to prepare a wet smear. In a similar manner, a wet smear can be prepared from the pipette at the time of inoculation.

PEDIATRICS

Sex Reversal in Newborn Babies. K. L. Moore. Lancet 1:217-219 (Jan. 31) 1959 [London].

Sex reversal may be detected in the newborn infant by the sex-chromatin test. Oral smears were collected over a period of 12 months from 3,715 babies (1,911 males and 1,804 females) born at the Winnipeg General Hospital. The oral mucosa of the infants was scraped with a sterile nickel spatula, and the material deposited on a slide. Each smear was fixed immediately in equal parts of ether and 95% ethyl alcohol, the fixation extending overnight. The smears were stained with cresylecht violet. They were examined under the oil-immersion objective of a binocular microscope for the presence or absence of visible sex chromatin. The anatomic sex of the infant was unknown to the microscopist at the time of the examination. Infants with a chromosomal sex opposite to their anatomic sex were given a special examination.

All except 5 of the infants had a chromosomal sex consistent with their anatomic sex. The 5 exceptions were all anatomic males; they were normal-appearing infants but had sex-chromatin patterns typical of chromosomal females. The proportion of nuclei counted exhibiting female-sex chromatin ranged from 53 to 64%. These chromatin-positive males are regarded as exemplifying female-to-male sex reversal. The results of this investigation indicate that female-to-male sex reversal is commoner than male-to-female sex reversal, for no sex-reversed males were detected among the 1,804 anatomic females tested.

In commenting on the probable future development of chromatin-positive newborn males, the author mentions the possibility of testicular dysgenesis, of sterility or fertility, and of the possibility of the hereditary transmission of the chromatin-positive male characteristic. He suggests that the 5 chromatin-positive males in the present series will probably show normal sex development until puberty. Some will probably develop characteristics of testicular dysgenesis during adolescence, some may also become mentally abnormal, but others may become normal-appearing fertile males. The etiology of female-to-male sex reversal is also discussed. While early deficiency of primordial germ-cells in the gonads has been suggested as a causative factor for sex reversal in patients with testicular dysgenesis, the author suggests other possibilities, particularly the possible role of hormonal imbalance.

Aldrich's Syndrome (Thrombocytopenia, Eczema, and Infection in Infants): Studies of the Defense Mechanisms. W. Krivit and R. A. Good. A.M.A. J. Dis. Child. 97:137-153 (Feb.) 1959 [Chicago].

The authors report on 7 male infants, between the ages of 3 and 22 months, with Aldrich's syndrome, clinically manifested by rectal bleeding, petechiae, eczema, suppurative otitis, infections consisting of bronchopneumonia or abscess, and an abnormally depressed platelet count. In 4 of the 7 patients a positive familial history was obtained, which fulfilled the requirements for a sex-linked recessive trait by which the syndrome appears to be transmitted. The typical onset of melena in the neonatal period was noted in 5 of the 7 children. Persistent thrombocytopenia and normal numbers and morphology of megakaryocytes were observed. Peripheral end-marrow eosinophilia was noted. The examinations of the bone marrow revealed a mild plasmacytosis and toxic changes among the neutrophils, but no other abnormalities. Nonspecific inflammatory changes were noted in the skin and lymph-node biopsy specimens. Autopsy in one patient and lymph-node biopsy in another revealed multiple thromboses of small arterioles. All the patients died despite cortisone and corticotropin therapy followed by splenectomy in one patient and despite multiple types of antiallergic therapy in the others.

Because of the frequency and severity of infections noted, an investigation of the defense mechanisms was made. This revealed no clear evidence of deficiency of the immune response to most antigens. The isoagglutinins were regularly absent in these patients. Gamma-globulin levels were normal or slightly elevated. Properdin levels were normal. Leukocyte function in the inflammatory reaction, migration, and phagocytosis were within normal limits. The causation of the thrombocytopenia was studied. No platelet agglutinins were noted. Normal production of platelets was apparent. The thrombocytopenia did not show any relation to the course of the eczema. A study of adrenal function revealed the presence of normal circulating plasma 17-hydroxycorticosteroids. Also, the response of 17-hydroxycorticosteroid levels to stimulation with corticotropin was normal. All attempts at treatment of the disease remained unsuccessful, though both adrenal steroid therapy and systemic treatment with estrogen and progesterone ameliorated the eczematoid processes.

Purpura Fulminans. S. E. Crawford and J. G. Riddler. A. M. A. J. Dis. Child. 97:198-201 (Feb.) 1959 [Chicago].

The authors report a 9-year-old girl who was admitted to the Jackson-Madison County General Hospital in Jackson, Tenn., because of purpura and ecchymotic areas over the lower extremities. Four hours after admission the patient went into severe hemorrhagic shock. Therapy consisted of intravenous administration of levarterenol bitartrate, whole blood, and hydrocortisone sodium succinate, in addition to massive doses of crystalline penicillin. Fifteen hundred cubic centimeters of whole blood was given slowly during the next 24 hours, and the patient's condition improved. On the second hospital day the bleeding time was 6 minutes, the platelet count was 40,000 per cubic millimeter, and the hemoglobin level was 15 Gm. per 100 cc. Three days later the bleeding time became normal; the platelet count reached 480,000, and after another 3 days it was 507,000. The skin of the lower extremities showed no advance of ecchymosis 12 hours after the institution of hydrocortisone therapy but these areas showed early slough and blister formation on the second hospital day. On the 14th hospital day the patient showed partial-thickness loss of skin over large areas of the left thigh, legs, and dorsum of the feet. A portion of all the toes of the right foot showed dry gangrene of the distal and inferior portions. There were scattered areas of full-thickness skin loss on the left thigh and the legs. The left leg and foot showed large areas of skin loss with dry gangrene of the distal half of the lateral 3 toes. The toes were allowed to heal and slough without excision. Complete healing of all the lesions had occurred 7 weeks after the onset of illness. The prompt and dramatic response of purpura fulminans in this patient far outweighs the very real danger of the use of adrenal cortical hormone in the presence of active infection. Survival in this usually fatal condition depends on early diagnosis and prompt adequate therapy.

Familial Addison's Disease: Case Reports of Two Sisters with Corticoid Deficiency Unassociated with Hypoaldosteronism. T. H. Shepard, B. H. Landing and D. G. Mason. A. M. A. J. Dis. Child. 97:154-162 (Feb.) 1959 [Chicago].

The authors report on 2 sisters in whom during their second year of life hyperpigmentation, weakness, and later convulsions occurred. One of the 2 patients died at the age of 30 months, and autopsy was performed. The clinical course of the other patient with a diagnosis of adrenal cortical hypofunction (Addison's disease), who is living, was followed from the age of 3 years to that of almost 5 years. Both patients were abnormally tall. The autopsy findings in the older sister corresponded closely with what would be expected in the younger sister according to clinical studies. These children did not have the classical form of Addison's disease in that the electrolyte-regulating mechanism of the adrenal cortex was functioning; aldosterone production was normal, although corticoid production was inadequate. In the younger patient, the serum protein-bound iodine level was slightly elevated. Neither of the 2 patients had any symptoms or signs suggesting secondary hypothyroidism.

In the patient who died, both the right and the left adrenal glands were difficult to identify on autopsy. Sections of the adrenal glands showed marked atrophy of cortical tissue. Only occasional clumps of cortical cells remained in the zona glomerulosa. All cells of the zona fasciculata and zona reticularis were absent. Autopsy also revealed the presence of the anterior pituitary in which the chief microscopic finding consisted of marked decrease of both basophil and acidophil cells. There was no evidence of any hypothalamic damage, either on autopsy in this patient or on clinical grounds in the other. The pituitary of the patient who died appeared to be responding to the state of adrenal insufficiency, suggesting that the initial endocrine defect lay in the adrenal glands rather than in the hypophysis; this concept was supported by the observation of the selective damage of the zona fasciculata and zona reticularis of the adrenal glands, perhaps due to a genetically determined metabolic disorder or to common exposure to an infectious or toxic agent. An alternative explanation is that the patients reported on shared a familial defect in anterior pituitary function, which resulted in a specific inability of the anterior pituitary basophil cells to secrete corticotropin (ACTH). The presence of mineral-corticoid activity in the absence of other corticoid activity is an unusual finding in patients with adrenal cortical hypofunction.

Bronchogenic Cysts in Infants and Children. J. W. Herrmann, T. C. Jewett Jr. and G. Galletti. J. Thoracic Surg. 37:242-250 (Feb.) 1959. [St. Louis].

Seven boys and 5 girls with congenital bronchogenic cysts were operated on in the surgical department of the Children's Hospital in Buffalo, N. Y. Of these 12 patients, 4, between the ages of 1 day and 2 months, had expanding pulmonary cysts and were admitted as either acute or subacute respiratory emergencies. All 4 patients had a history of rapid and progressive cyanosis and dyspnea. The pertinent physical findings were hyperresonance, decreased breath sounds, and evidence of mediastinal shift as noted by the position of the apical heart beat. Chest roentgenograms revealed single or multiple well-circumscribed, thin-walled cystic structures which were occupying part or all of one hemithorax. The cysts partially or completely compressed the adjacent lung parenchyma. Other confirmatory signs which indicated the expanding nature of the cyst were depression of the hemidiaphragm and widening of the interspaces on the involved side. Two of the 4 patients had lobectomies and one had a pneumonectomy, with uneventful postoperative courses. The 4th infant underwent laparotomy because of an erroneous roentgenologic diagnosis of diaphragmatic hernia; the patient died suddenly before thoracotomy could be performed. Pathological examination of the resected specimens revealed single or multiple cysts lying within the lung parenchyma with surrounding atelectasis. On cross section, they had a smooth, pale, glistening surface with a glary type of mucus on the wall. Some were crossed by fine trabeculae, whereas others were multiloculated. A bronchial communication was usually demonstrable. Inflammation was not prominent.

The remaining 8 patients, between the ages of 6 months and 9 years, had secondarily infected pulmonary cysts occurring as a result of bacterial invasion of a previously sterile cyst. These children had a classical clinical history of intermittent respiratory infections with asymptomatic intervals. The first attacks were usually interpreted as bronchitis or pneumonia. After several such attacks, chest roentgenograms established the correct diagnosis. The commonest symptoms and signs in these patients during the acute stage of their disease were those of pulmonary suppuration, namely, fever, dyspnea, cough, and purulent sputum. The roentgenographic picture of the secondarily infected cysts differed from that of the expanding cysts in that there was little evidence of compression of surrounding structures. The cysts appeared extremely round, smoothly outlined, and thin-walled with varying degrees of pneumonitis and frequent evidence of fluid levels. Three of the 8 children underwent pneumonectomy, 4 underwent lobectomy, and 1 had marsupialization and subsequent thoracoplasty performed. One patient who had several attacks of cardiac arrest during pneumonectomy died shortly after the operation, and another patient died on the operating table during right middle lobectomy. Both deaths were attributable to massive flooding of the contralateral lung by infected material from the cysts, and would be preventable today by proper preoperative preparation with antibiotics, postural drainage, and bronchoscopy. Pathological examination of the surgical specimens revealed a definite predilection for these cysts to occupy the lower lobes. Their gross appearance was similar to that of the expanding cysts, but infection supplanted the signs of compression of neighboring pulmonary tissue. On cross section, the bronchial-type mucosa had a glistening appearance. The cavity itself usually contained purulent exudate, and there was evidence of pneumonitis in the surrounding parenchyma.

Congenital pulmonary cysts may be divided into 2 major groups based on either of 2 presenting symptom complexes associated with expansion or infection. Expanding pulmonary cysts are usually found in newborn infants; since they may run a rapidly fulminating course, prompt diagnosis and surgical intervention are mandatory. Infected pulmonary cysts occur in older children and usually require a more protracted period for accurate diagnosis and adequate preoperative preparation. The treatment of choice in both types of congenital pulmonary cysts is by resection of the involved pulmonary parenchyma.

Rubella and Incidence of Congenital Abnormalities. V. P. Coffey and W. J. Jessop. Irish J. M. Sc. 6:1-11 (Jan.) 1959 [Dublin].

The authors present a survey of the outcome of pregnancies in mothers who either contracted or were in contact with rubella during the Dublin epidemic in 1956. Seventy-five patients who had been attending the antenatal outpatient departments of the 3 Dublin maternity hospitals and St.

Kevin's Hospital, Dublin, were found to have had contact with rubella or had had rubella. The condition of the babies at birth was noted, and 3 months after birth they were examined again in an effort to detect congenital abnormalities, such as lesions of the cardiovascular system or deafness, which would not have been obvious at birth. Forty-nine of the 75 patients had only had contacts. Five of the 75 patients gave birth to infants with congenital abnormalities, giving a rate of 67 per 1,000 as compared with 16 per 1,000 in a previous survey conducted in Dublin maternity hospitals between 1953 and 1954, when rubella was not epidemic. Infected mothers had a higher percentage of congenitally deformed children than had those who were only contacts of the disease. Mothers who contracted the infection during the first trimester of pregnancy had a higher percentage of congenitally deformed children than had those who contracted rubella during the last 6 months. There was no such trend in the incidence of congenital abnormalities among infants born to mothers who were exposed to rubella but did not contract the disease.

Gamma globulin had been given to 2 mothers who had contact with rubella within the first 2 months of pregnancy, and both had normal babies. No relationship could be found between incidence and sex of the baby in either infected or exposed mothers. As regards weight of the babies at delivery, a higher proportion of the children of mothers who actually had the disease were below normal weight at birth than were those of mothers who were only contacts of the infection. It is suggested that girls be encouraged to become contacts of rubella with a view to contracting the disease before marriage, that the pregnant woman who has not had rubella avoid contact with the infection during pregnancy, and that, if such a woman becomes a contact, the development of the infection be prevented by administration of immune serum or gamma globulin.

On the Use of Cortisone Preparations in Hemolytic Disease of Newborn Infants Due to Isoimmunization in the ABO System (Effect of Cortisone Preparations on Bilirubinemia). G. Murano and E. Barbagallo. Pediatria 66:889-901 (Nov.-Dec.) 1958 (In Italian) [Naples].

Two newborn infants with hemolytic disease due to maternal immunization were treated with cortisone preparations. The values of bilirubin in blood taken 12 hours after birth were 14.4 mg. per 100 cc. in the first child and 13.5 mg. per 100 cc. in the second. The first child was given 20 mg. of prednisone per day for 10 days and 5 mg. per day for the following 10 days. A marked improvement in its general condition was already present by the 12th day of treatment when the concentration of bilirubin had dropped to 3.8 mg. per 100 cc. Seven months later the infant was seen again and was found to be in good general condition. There were no clinical signs of encephalic involvement, and development had been normal. The second child was given 15 mg. of prednisone per day for the first 10 days and 5 mg. per day for the following 10 days. The general condition of the infant had improved markedly by the 10th day of treatment, the concentration of bilirubin having dropped to 3.2 mg. per 100 cc. When the child was seen again after 7 months, it was found to be in good general condition, and its development had been normal. The prednisone therapy had had a good effect, especially on the indirect bilirubin values in both children. The authors believe that cortisone preparations not only check the hemolytic disorder but also stimulate the enzymatic activity of the liver.

The Natural Clinical History of Choreo-Athetoid "Cerebral Palsy." P. E. Polani. Guy's Hosp. Rep. 108:32-45 (no. 1) 1959 [London].

An attempt was made to obtain a clearer clinical picture of the sequence of neurological events in choreoathetoid cerebral palsy, a form of cerebral palsy characterized by the presence of athetosis, chorea, or a mixture of these 2 conditions with unwanted movements that are more difficult to define and describe. Seventy-three children (39 girls and 34 boys) with this form of the disease were studied. Fifty-five of the children were first seen before the age of 5 years, 29 before the age of 1½ years, and all 73 before the age of 10 years. When last seen, 52 were more or less ambulant, and 21 were nonambulant. All patients had unwanted movements which in most of the patients were present at rest; in the remainder these movements appeared only in response to an attempt to move or in association with emotional tension. In 6 patients some muscle groups showed spastic hypertonia. Intermittent hypertonia was present in 14 patients. The tone appeared normal in 8 patients when they were fully relaxed, and in an additional 8 the tone was thought to be decreased. The remaining 37 patients had definite hypotonia when they were fully relaxed. Twelve of the 73 patients had paralysis of voluntary upward conjugate eye movements, and 28 had severe but not total loss of hearing.

Etiologically the 73 patients were subdivided into 3 groups. Twenty-two had a history of severe neonatal jaundice due to Rh isoimmunization, 16 had had severe neonatal jaundice without evidence of blood group incompatibility between mother and infant, and the remaining 35 patients had no history of severe neonatal jaundice, but a history of various complications of delivery and neonatal condition. A history of disturbance of pregnancy, such as toxemia or nontoxic separation of the placenta, was elicited in 2 of the 16 patients in the second group. The incidence of prematurity was highest in the second group in whom jaundice had been found without evidence of blood group isoimmunization. In the third group without jaundice, one-third were premature, one-quarter were born through breech delivery, and three-quarters had clinical asphyxia in the perinatal period. The patients in the first group with kernicterus due to immunization had the most stormy neonatal period, with twitching and opisthotonos. All the patients without neonatal jaundice had a history of sucking or swallowing difficulty from the start, and a substantial number of these patients had neonatal fits, cyanotic attacks, and frequent vomiting.

The neonatal symptoms in the 73 patients had commonly disappeared by the end of the second week of life, so that between the ages of 2 weeks and the end of the first or second month of life there was generally a silent period except for common difficulty in feeding and respiratory stridor. After the second month of life the presence of a neurological disturbance became evident in 9 out of 10 patients, and nearly all showed delayed development to a greater or less extent. Thirty-seven patients had opisthotonic attacks, 25 had hypertonia, and 3 had striking hypotonia. At the end of the first year 23 had marked hypotonia. Of 56 patients in whom the onset of unwanted movements could be reasonably accurately timed, these appeared before the age of 2½ years in 39 and between 3 and 3½ years in the remaining 17.

These data show that in about 50% of the patients with this type of cerebral palsy there is a strong link with a clear-cut causative factor (severe neonatal jaundice), while in the other 50% interference with normal oxygenation in the perinatal period seems to be causatively involved. It appears that much more prospective work by individual observers is necessary if the clinical problems posed by the natural history of the various forms of cerebral palsy are to be solved. Preferably, the clinical examination should be conducted before obtaining a history.

Acute Gastro-Enteritis in Infants and Young Children with Special Reference to Some Etiological Factors (Analysis of 665 Cases). S. S. Manchanda and N. N. Arora. Indian J. Pediat. 25:599-607 (Nov.) 1958 (In English) [Calcutta].

Of 4,438 children admitted to the department of pediatrics of a hospital in Amritsar, India, between July, 1955, and December, 1957, 665 (450 boys and 215 girls) had acute gastroenteritis. This high incidence of acute gastroenteritis (15%) is not surprising with the present low state of sanitation and ignorance about food hygiene in the province of the Punjab. Five hundred fifteen (77.4%) of the 665 children were between the ages of 1 and 12 months, 113 were between the ages of 13 and 48 months, and 37 were over 48 months of age. Of the 665 children, 109 (16.4%) died; 79 of these were less than one year old. Three hundred ninety-seven (59.7%) of the 665 children were admitted during the summer months (May, June, and July), as compared with only 268 children admitted during the remaining 9 months. There was a mortality rate of 21.3% among the bottle-fed infants, as compared with a mortality rate of 9.18% among the breast-fed infants.

Although breast feeding is not unpopular in the Punjab, breast feeding is supplemented by bottle feeding in 70 to 75% of the infants, buffalo milk diluted with water and modified with various aromatics often being used. The early introduction of a milk rich in fat caused diarrhea. Poor housing conditions and the lack of proper lavatory arrangements also contributed to the occurrence of gastroenteritis. Eighty-four strains of various bacteria were isolated from 60 diarrheal stools studied bacteriologically. In most of the cases several pathogenic organisms were isolated from the culture of the fecal specimens. Serologic types of Escherichia coli were isolated from 30% of the total specimens, Paracolobactrum organisms from 31.6%, Staphylococcus pyogenes var. aureus from 21.6%, Streptococcus faecalis from 21%, Proteus organisms from 20%, Pseudomonas aeruginosa from 13.3%, and Shigella flexneri from 1.2%.

The causation of diarrhea among these Indian children thus involved several environmental factors, such as feeding, atmospheric humidity, seasonal incidence, social status, and food hygiene; in many instances a bacterial pathogenic agent was recognizable. The highest incidence was observed among bottle-fed infants during summer. Other gram-negative bacilli and gram-positive cocci than the serologic types of Esch. coli seem to be important in the causation of gastroenteritis.

Diagnostic Value of the Determination of Serum Aldolase in Epidemic Hepatitis in Children. M. Leonescu, N. Cajal, V. Boeru and others. Ruman. M. Rev. 2:44-47 (July-Sept.) 1958 (In English) [Bucharest, Romania].

Aldolase levels were determined in the serums obtained from 61 children, between the ages of 16 months and 10 years, admitted with epidemic hepatitis to a children's hospital for infectious diseases in Romania in 1956 and 1957. Jaundice was present in 38 patients and was absent in 23. Serum aldolase values were determined also in 25 normal persons, in 33 patients with miscellaneous noninfectious diseases, in 7 adult contacts of children with epidemic hepatitis, in 2 children with measles, and in 4 children with epidemic parotitis. The adolase activity in normal persons varied from 4 to 20.3 units and averaged 9.7 units. The aldolase activity in the patients with noninfectious diseases averaged 12.1 units. The mean values of aldolase were 19.4 units in the children with measles and 24.5 units in those with epidemic parotitis. In the adult contacts of children with epidemic hepatitis, the mean aldolase value was 18.3 units.

In the 38 children with epidemic hepatitis associated with jaundice, the average serum aldolase values were 75.4 units during the first week, 46.8 units during the second week, 32.6 units during the third week, and 17 units during the fourth week. The average aldolase values in the 23 children with epidemic hepatitis not associated with icterus were 85.3 units during the first week, 41.1 units during the second week, 23.7 units during the third week, and 20.1 units during the fourth week. The over-all average value of the 23 determinations of serum aldolase in these patients was 52.1 units.

None of the patients with positive results from dysproteinemia tests had normal serum aldolase values. There were 5 children with increased serum aldolase values who had normal results from dysproteinemia tests and who had no bile pigments in the urine. The urobilinogen test revealed normal values in 4 of these 5 patients and slightly increased values in 1. The diagnosis of epidemic hepatitis in these 5 patients was made on the basis of epidemiologic and clinical features and was confirmed by the increased serum aldolase level. The maximum value of serum aldolase found in the determinations made in the 61 children with epidemic hepatitis was 146.1 units, i. e., almost 15 times the normal value, but an increase in aldolase level to 2 to 8 times its normal value (as determined by other workers) is to be considered as a pathological increase. Discrepancies in results may, in fact, be due to the different techniques employed.

According to most workers the serum aldolase level reaches its peak during the first week of the disease, with a subsequent decrease during convalescence. Though nonspecific, the increase in the serum aldolase level is a far more reliable laboratory aid in the diagnosis of epidemic hepatitis than the dysproteinemia tests. The results obtained in the children with nonicteric epidemic hepatitis justify the use of the determination of the serum aldolase level on a larger scale in the diagnosis and differential diagnosis of nonicteric epidemic hepatitis. The study of the serum aldolase level in contacts of patients with epidemic hepatitis may be of aid in the diagnosis of subclinical infections, thus acquiring a prophylactic and epidemiologic value as well.

Scrofula Caused by Atypical Mycobacteria. J. S. Chapman and L. R. Guy. Pediatrics 23:323-331 (Feb.) 1959 [Springfield, Ill.].

Several recent reports on human infection by atypical mycobacteria referred to disease of cervical lymph nodes in young children. The authors present the histories of 6 children with scrofula caused by atypical mycobacteria. The children ranged in age from 20 months to 5 years. The lymph nodes removed for biopsy or aspirated pus were inoculated into various mediums. Colonies were exposed to various lights, were subcultured, and were tested for drug susceptibility, with the neutral red test, and for catalase production. All strains were injected into the groins of guinea pigs and intravenously into rabbits. In addition to the studies of lymph node tissue or pus from scrofulous children, swabs were made from the tonsillar crypts or pharynges of 43 apparently healthy children referred to the clinic for Mantoux tests. The organisms removed from the enlarged nodes or from aspirated pus differed considerably among themselves, were clearly distinguishable from Mycobacterium tuberculosis, but resembled, or were identical with, those recovered from swabs of tonsils or pharynges of healthy children. It is not possible to regard all these organisms as belonging to the same strain; they belonged to the general group of chromogenic mycobacteria.

A summarization of the histories of the 6 children provides several points of clinical differentiation from true tuberculous scrofula. These children did not originate from tuberculous families, as shown by roentgenologic examination of the parents and the negative Mantoux tests of the siblings. The infected children themselves had weak or negative reactions to tuberculin. The enlarged nodes were not associated with mediastinal adenopathy, bronchial obstruction, disease of bone, or other lesions. The onset of the infection was usually rapid and was sometimes associated with rather high fever, perhaps resulting from pharyngitis. The cervical nodes underwent rapid enlargement and early suppuration. The disease remained localized to the submandibular group, as opposed to scrofula caused by Myco. tuberculosis of the human type; the latter involves several groups of lymph nodes, progresses slowly, produces comparatively less enlargement and much less suppuration of nodes, is associated with contacts, and is nearly always an incidental finding in the course of a progressive primary infection with marked tuberculin sensitivity. This disease seems to be due to invasion by chance of the deeper structures by oropharyngeal contaminants, perhaps preceded by ordinary infections in the oropharynx. No evidence points to person-to-person transmission.

Maple Syrup Disease: Isolation and Identification of Organic Acids in the Urine. J. H. Menkes. Pediatrics 23:348-353 (Feb.) 1959 [Springfield, Ill.]

When the author and his associates in 1954 reported 4 cases of a familial cerebrodegenerative disease, characterized by the excretion of urine with a maple sirup-like odor, they were unable to determine the nature of the substance responsible for the urinary odor. Since then, 6 additional cases of the syndrome, occurring in 3 unrelated families, have been brought to their attention. The disease in all these children was characterized by early onset of spasticity and myoclonic seizures with rapid progression to decerebrate rigidity. Death ensued between 15 days and 20 months of age. The author obtained urine samples excreted by one of these children during the last months of life. These urine samples contained large amounts of alpha-ketoisocaproic acid, the keto analogue of leucine, together with smaller quantities of the keto acids of valine (alpha-ketoisovaleric acid), and isoleucine (alpha-keto-beta-methyl-n-valeric acid). These substances may indirectly be responsible for the unusual urinary odor.

The presence of large quantities of keto acids in the urine represents a distinctly abnormal phenomenon. The presence of several keto acids in association with a severe cerebrodegenerative disease suggests that these 2 findings are causally related and recalls the findings in phenylketonuria. In the latter condition, the urine has a peculiar "mousy" odor, probably caused by the presence of phenylacetic acid. The author discusses several possibilities that may account for the accumulation of alpha-keto acids in the urine. He believes that a failure of the transamination reaction or a failure in the excretion or utilization of amino acids can be excluded, but that an impairment of the degradative metabolism of the branched-chain amino acids may be an important cause of the cerebral degeneration in maple sirup disease.

DERMATOLOGY

Relaxin (Releasin) Therapy in Diffuse Progressive Scleroderma: A Preliminary Report. J. A. Evans. A. M. A. Arch. Dermat. 79:150-158 (Feb.) 1959 [Chicago].

The author reports on 9 women and 2 men, between the ages of 19 and 55 years, with scleroderma who had undergone sympathectomy and were treated with relaxin (Releasin), a polypeptide-like hormone obtained from the ovaries of pregnant sows. Scleroderma was especially severe in the hands and face. All but one patient had Reynaud's phenomenon. Nine of the 11 patients had esophageal involvement, 6 had pulmonary scleroderma, 1 had gastric scleroderma, 1 had intestinal scleroderma, and 4 had laryngeal involvement and were hoarse. Seven patients received relaxin intravenously for 3 to 7 days in increasing doses varying from 2.5 to 80 mg. in 5% dextrose and isotonic sodium chloride solution. After preliminary intravenous administration, a gel preparation was given intramuscularly in doses ranging from 30 to 50 mg. 2 to 7 times a week. Four patients subsequently received rectal suppositories containing 40 mg., taken each night. All patients were primed with diethylstilbestrol in doses of 1 mg. daily, and this was continued throughout therapy. Duration of treatment ranged from 7 to 23 months.

Relaxin helps to loosen the skin of patients with scleroderma. Sympathectomy combined with relaxin and diethylstilbestrol therapy brought greater flexibility of the skin in 8 of the 11 patients, being most effective in the face, neck, upper and lower arms, chest, abdomen, and legs. The hands showed a little improvement, such as healing of ulcers or erosions, but finger mobility was rarely improved. Relaxin seems to have a better effect in sympathectomized areas of the skin. In 2 patients who had received relaxin before sympathectomy, the skin showed no definite improvement, but in 3 patients who received relaxin immediately after sympathectomy, the skin of one was notably improved; the second patient showed improvement in the unsympathectomized facial, cervical, and arm skin but only slight improvement, as yet, in the sympathectomized area of the leg with an ulcer; the third patient died after treatment was started. Further loosening of the skin resulted in 4 of 6 patients in whom relaxin therapy was begun 4 months to 4¾ years after sympathectomy when improvement had reached a plateau.

One patient with severe pulmonary scleroderma was twice saved from acute pulmonary decompensation by vigorous therapy with relaxin given intravenously. Notable improvement of the voice occurred in 2 patients with laryngeal involvement, one of these being able to sing again. In one patient leg ulcers, which had been present for 23 years and persisted after lumbar sympathectomy, finally healed on relaxin therapy. In another patient with a leg ulcer, who had undergone only a thoracic sympathectomy, the ulcer healed in 2 months on relaxin suppositories when desultory therapy with intramuscular injections had failed. Improvement of dysphagia was notable in 4 of the 9 patients with esophageal scleroderma; 8 of the 9 patients in whom scleroderma of the esophagus had been revealed by x-ray examination still showed evidence of the disease by barium swallow. Three of the 11 patients died: one died of esophageal involvement; one with intestinal involvement died of unknown cause; and one died of an anaphylactoid reaction after intravenous administration of relaxin.

Pseudohypoparathyroidism: The Seabright Bantam Syndrome. C. W. Laymon and A. Zelickson. A. M. A. Arch. Dermat. 79:194-201 (Feb.) 1959 [Chicago].

Pseudohypoparathyroidism is a rare disease characterized by tetany and convulsions, low serum calcium level with elevation of serum phosphorus level, symmetrical obesity with round full facies, stubby fingers, acalcification of dental roots, and mental retardation in some patients. There is a failure of the appearance of phosphorus diuresis after the intravenous administration of parathyroid extract. Pseudohypoparathyroidism has the same symptomatology, chemical findings, and physical signs as hypoparathyroidism, but the cause of the disturbance is a resistance to, rather than a lack of, parathyroid hormone. It seems likely that there is an end-organ (kidney) failure to respond to parathyroid hormone, which results in the chemical aberrations in the blood of patients with pseudohypoparathyroidism.

The skin is not especially helpful in diagnosis of pseudohypoparathyroidism, since there are no constant or pathognomonic cutaneous lesions. In most cases collected from the literature, the skin was not mentioned. In some patients whose cases were reported by other workers, there was cutaneous dryness and coarseness, facial hypertrichosis, thinning of the fingernails, sparseness of hair on the scalp, face, and axillas, and scaly lesions at the angles of the mouth. Flushing of the face was mentioned in one case. The authors report on a 2½-year-old girl with pseudohypoparathyroidsim who had lichenified plaques on the face and neck simulating seborrheic dermatitis and lesions on the scalp which resembled psoriasis. The entire skin of the patient was dry and scaly, resembling ichthyosis. Microscopic examination of a dry scaly plaque on the right forearm showed moderate hyperkeratosis of the epidermis. There were scattered islands of parakeratosis and accumulations of inflammatory infiltrate in the papillary portion of the cutis. The primary disease of the patient was steatorrhea. Although the cause of pseudohypoparathyroidism is unknown, it seems to be hereditary rather than acquired. Steatorrhea may play a role in some cases.

Laboratory Studies in a Series of Biologic False-Positive Reactors. J. L. Miller, M. Brodey and J. H. Hill. A. M. A. Arch. Dermat. 79:206-212 (Feb.) 1959 [Chicago].

The authors report on 79 patients, between the ages of 23 and 82 years, most of whom were from the dermatological department of the Vanderbilt Clinic in New York but some were seen in private practice. All the patients had a biological false-positive reaction to one or more of the standard tests for syphilis and were subjected to a variety of laboratory tests, one or more of which showed abnormality in 57 of them. The 79 patients were divided into 2 groups. Sixty-seven patients (15 men and 52 women) showed no clinical evidence of disease, except for the finding of a biological false-positive reaction to the standard tests for syphilis, with a known mean duration of this reaction for 5 years; 47 of these showed abnormalities in the laboratory tests done. Twelve patients (1 man and 11 women), with a biological false-positive reaction of mean duration for 3 years, had clinical evidence of systemic disease. The diagnoses made in these 12 patients included rheumatoid arthritis, Laennec's cirrhosis, congenital hemolytic anemia, cryoglobulinemia, cerebral vascular accident, systemic lupus erythematosus, diabetes mellitus, brain tumor, migratory polyarthritis, convulsive disorder, and generalized lymphadenopathy. Ten of these 12 patients had positive results of the laboratory tests to which they were subjected. The second group of patients listed as systemic, in contrast to the first group listed as nonsystemic, thus had a higher proportion of positive results of the laboratory tests.

The laboratory tests, in the order named, were those showing the highest incidence of abnormality: serum electrophoretic pattern (showing a wide variation in the type of derangement in the serum protein level), cephalin flocculation, thymol turbidity, erythrocyte sedimentation rate, and complete blood cell count. The performance of these tests is advocated in patients with biological false-positive reactions to one or more of the standard tests for syphilis. The diagnosis of biological false-positive reaction is always of serious significance. It is commoner and of more concern especially in young women because of the higher incidence of systemic lupus erythematosus in this group. Despite the serious significance of a biological false-positive reaction, many of the patients with this finding exhibited no apparent ill-effects over many years. These variations are present in many chronic diseases. Alertness to the potentialities, careful observation, and laboratory studies are at present the best means of defense.

UROLOGY

Perirenal (Gerota's) Fascitis. J. A. Hutch, R. C. Atkinson and G. S. Loquvam. J. Urol. 81:76-95 (Jan.) 1959 [Baltimore].

Sudden complete anuria due to compression of both ureters by a dense, grayish-white mat of fibrous connective tissue, which also involves the abdominal aorta and inferior vena cava, was described by Ormond in 2 patients in 1948. Since then 19 similar cases have been described in the literature, and in this paper the authors present 2 new cases and a 5-year follow-up on one of the previously reported patients. They emphasize that this urologic entity should be distinguished from periureteritis plastica; it is an inflammatory disease confined within the perirenal (Gerota's) fascia. The first of their 2 patients died 4 days after admission to hospital. The second patient was operated on and survived. Anuria is the cardinal symptom. In 8 of the 23 patients complete anuria developed suddenly, and in 2 others oliguria developed. The remaining patients probably would have become anuric but for the surgical intervention. During the preanuric phase the urologic nature may not be recognized. Several patients were first investigated on the orthopedic, neurological, medical, or surgical services before the urologic aspects became evident. The clinical pattern is that of chronic, rather than acute, disease. A palpable mass over the sacral promontory is pathognomonic, but it was noted in only 2 of 23 cases. The authors believe, however, that, as this disease becomes better known, urologists will be able to palpate this mass more frequently. In roentgenologic visualization of the upper urinary tract, the segment of the ureter involved in the plaque lies medial to the normal position.

Previous pathological studies on small bits of plaque obtained by biopsy revealed dense, fibrous connective tissue with some fat and inflammatory cells. Autopsy studies on the fatal case presented here revealed a plaque-like mass of dense, grayish-white fibrous connective tissue that extended superiorly from a level just below the sacral promontory for 14 cm. It was 6 cm. in width at its widest point and 3 cm. in thickness at its thickest point. This plaque completely surrounded the aorta and both ureters and incompletely surrounded the inferior vena cava. The ureters seemed to be pulled medially, and their lumens were obliterated by compression. The peritoneum was densely adherent to the plaque. In addition, several loops of the small intestine adhered to the peritoneum over the plaque at the level of the sacral promontory. Multiple microscopic sections revealed that this is a benign process.

Treatment may furnish a clue to diagnosis, since in 6 of 7 patients, in whom anuria was treated by bilateral ureteral catheterization, the disease recurred when the catheters were withdrawn. The patients improved and the uremia diminished as long as the ureteral catheters were in place and draining well. Once the diagnosis has been established, the safest procedure is to institute nephrostomy drainage immediately. The surgical attack on the obstructing tissue may be handled in several ways. In some cases the transperitoneal approach is used. The second operative approach is the standard retroperitoneal incision. The problem of freeing the ureter varies, and after it has been solved, further contact between the ureter and the plaque must be prevented. The ureter has been sutured to the peritoneum or psoas muscle with an absorbable (catgut) suture. It is also possible to sew the peritoneum or the perirenal (Gerota's) fascia to the psoas in such a way that the ureter is deprived of any further contact with the scar tissue plaque. Unfortunately, even after the ureter has been freed, hard fibrotic areas still remain. The results of treatment leave much to be desired in that 4 of the 23 patients have died, and, of the remaining 19 alive when last seen, 7 had lost one kidney and several had residual damage in the remaining kidney.

Discussing the differential diagnosis between perirenal fascitis and periureteritis plastica, the authors point out that in the 4 patients with the latter condition described by Vest and Barelare Jr. the disorder was unilateral, whereas in all 23 of the cases reviewed here it was bilateral. Furthermore, in the cases of Vest and Barelare Jr. the ureters were in their normal positions, whereas in perirenal fascitis the ureters lay medial to their normal positions. In periureteritis plastica the ureter was attached to the lumbar muscles rather than being pulled medially against the vertebral bodies or vena cava or aorta. Although these 2 diseases have some features in common (compression of the ureter by periureteral inflammation and a similar histological pattern of the periureteral tissue) and may be related, the authors believe that they are separate entities.

Unilateral Multicystic Kidney: Report of 6 Cases and Discussion of the Literature. M. G. Fine and E. Burns. J. Urol. 81:42-48 (Jan.) 1959 [Baltimore].

Unilateral multicystic kidney is a congenital disorder, resulting from fetal maldevelopment, in which an irregularly lobulated mass of cysts of varying size completely replace the renal tissue. Many other terms have been applied to this disorder, but the authors are of the opinion that "unilateral multicystic kidney" describes this defect most accurately. When they encountered 2 infants with this disorder within a period of a few weeks, they reviewed the literature and searched the records of Charity Hospital of Louisiana, New Orleans, for the past 20 years for similar cases. They were able to find only 48 antomically proved cases in the literature. In addition to the 2 aforementioned infants, they found 4 others whose cases were recorded at Charity Hospital. The histories of these 6 infants are descibed. Of the 19 males and 29 females whose cases were collected from the literature, 32 were infants or children. Calcification was present in 14 patients, almost all adults, 2 of whom had osseous changes. Cartilage was found in the specimens of 3 children. In 43 cases a definite ureteral abnormality varying from complete absence to stenosis was present. In 6 cases congenital anomalies of other organs were present.

No entirely satisfactory etiological explanation for this nonhereditary congenital defect has been offered. In gross appearance the unilateral multicystic kidney has been likened to a bunch of grapes. Microscopically, the cysts are lined with a single layer of flattened or cuboidal epithelial cells, and the walls are composed of fibrous tissue sometimes with hyaline or calcific changes. These cystic kidneys may cause no symptoms. Usually a unilateral, lobulated, nontender, movable mass is palpated in the flank or abdomen of an otherwise healthy infant. Pressure on the adjacent intestines sometimes causes gastrointestinal symptoms. Pain, fever, hematuria, pyuria, and hypertension are rare. The presence of a lobulated unilateral renal mass in an infant or child with no demonstrable renal function and the absence or blind termination of the ureter on the affected side with an apparently normal functioning kidney on the opposite side should suggest the diagnosis. The prognosis following nephrectomy is good.

The Dissolution of Renal Phosphatic Calculi by Retrograde Irrigation. J. S. Elliot, J. P. Adamson and L. Lewis. J. Urol. 81:56-60 (Jan.) 1959 [Baltimore].

Elliot and associates report their experience with the dissolution of renal phosphatic calculi in 9 patients, 8 of whom were young adults severely paralyzed by poliomyelitis. They resorted to the use of citric acid solution, after they had found that Versene solution caused too much discomfort. The use of citric acid solution to dissolve phosphatic calculi was first reported by Albright, Sulkowitch, and Chute in 1939. These authors also showed that calcium oxalate calculi were insoluble in citric acid and suggested means whereby the composition of a stone might be inferred from the clinical findings and x-ray pattern. A solution less irritating than the original and containing magnesium was later described by Suby, Suby, and Albright. Since citric acid readily supports bacterial growth, the authors modified the solution described by Suby, Suby, and Albright by the addition of sodium benzoate in a concentration of 0.1%.

The irrigation is carried out with 2 polyethylene whistle-tip ureteral catheters, a size 5F and a size 7F or 8F. These are passed cystoscopically up to the involved renal pelvis. The eyes of the catheters are placed as nearly as possible in the midpoint of the renal pelvis. The smaller catheter is used for inflow, and the larger for outflow. The solution is run into the inflow catheter by continuous gravity drip at a rate of about 1 to 2 drops per second, and the outflow catheter is connected to gravity drainage by polyethylene tubing. The irrigation is continued day and night until dissolution is accomplished, or the procedure is terminated for other reasons.

In 2 patients rather large aggregates of renal calculi were completely dissolved, as were a number of recurrent calculi in a third patient. Chronic urinary infection which had been resistant to treatment responded to antimicrobials after dissolution of the calculi. In 5 other patients a marked reduction in the amount of calculous material was seen on x-ray examination. The calculi which underwent complete dissolution consisted of multiple small spherules, and all were known to have been present for less than one year. The calculi in one patient which were unaffected by the treatment were known to have been present for more than 3 years. Complete dissolution seems to be most feasible in the patient with multiple small calculi of relatively recent origin. The large staghorn calculus is less suitable for this type of treatment in view of the extended hospitalization required and the technical difficulties and complications which may be encountered. The citric acid irrigation treatment appears to be a reasonably safe procedure, provided that close nursing supervision is available. Unlike renal surgery, it may be repeated any number of times without increased technical difficulties.

The Management of Cystinuria and Cystine-Stone Disease. D. R. Smith, F. O. Kolb and H. A. Harper. J. Urol. 81:61-71 (Jan.) 1959 [Baltimore].

In contrast to the older concept that cystinuria is due to an "inborn error of metabolism," it is now generally believed that in patients with cystinuria the renal tubule is congenitally defective, insofar as the reabsorption of cystine, lysine, arginine, and ornithine is concerned. Since cystine is insoluble at the normal pH ranges of urine, formation of stones can occur, and then cystinuria becomes clinically important. Any patient who has passed renal stones in childhood, who has many recurrences, or who has a family history of renal stones should be investigated for cystinuria. All relatives of a patient with cystinuria should also be screened. The disorder is inherited as a recessive trait. One of the patients observed by the authors had 11 relatives with cystinuria. Only those with strongly positive tests, however, are likely candidates for stone formation and must be watched. The presence of typical hexagonal cystine crystals is diagnostic of cystinuria. These crystals are often difficult to find in dilute or alkaline urine. If glacial acetic acid is added and the urine is allowed to stand in a wide-bottomed flask in the icebox overnight, crystals can often be found in the centrifuged sediment. A quantitative assay of cystine excretion is likewise essential. When stones are available for examination, the diagnosis is simple. The typical yellowish, smooth, multifaceted stone permits diagnosis at a glance. The authors urge patients to bring in any stones passed previously. A roentgenogram is then taken of them on dental film in order to evaluate the density and homogeneity of the stone. Almost all ureteral stones will pass spontaneously, but a few will require cystoscopic manipulation or surgical removal. It is wise to postpone the surgical removal of asymptomatic cystine stones until an effective therapeutic regimen has been instituted, since the patient with uncontrolled cystinuria can form new stones rapidly.

Attempts were made to increase solubility of cystine by alkalinization, or to decrease its concentration by forcing of fluids, but they were not entirely satisfactory, especially in patients with severe cystinuria. The results of measures designed to decrease cystine output by chemical means, such as choline, or by low-protein diets have not been encouraging. The demonstration that methionine in dietary proteins is the principal source of exogenous cystine induced the authors to try a diet with a low-methionine content in 2 of their 4 patients with cystinuria who excreted extremely high amounts of cystine (3,000 to 3,600 mg. per 24 hours) and in whom alkalinization and forcing of fluids alone had failed to stop stone formation.

The essentials of a low-methionine (and cystine) diet are presented in an appendix to this paper. In the 2 patients receiving this diet, the authors found a notable and continuous reduction in the urinary excretion of cystine, arginine, and lysine. Moreover, there were no ill-effects (such as weight loss, asthenia, and anemia) for periods as long as 18 months. In one of the patients newly formed stones decreased in size; one stone disappeared, and the others became small enough to be removed cystoscopically. Both patients are now stone-free; their rates of cystine excretion are less than 600 mg. per 24 hours, i. e., in the range that forcing of fluids and some alkalinization can easily control.

Although the low-methionine diet may not be the final answer, at present it appears to be the most effective means of reducing cystine excretion in severe cases. The authors believe that the treatment of every patient with cystinuria must be individualized, and that the quantitative excretion of cystine is the basis for rational therapy, as well as for judging prognosis.

OPHTHALMOLOGY

Pseudotumor Cerebri or Benign Intracranial Pressure. O. Sitchevska. Am. J. Ophth. 47: 215-219 (Feb.) 1959 [Chicago].

The author presents the history of 2 girls, aged 5 and 7 years, respectively, with pseudotumor cerebri. The first patient, who had impairment of vision with marked bilateral papilledema and retinal hemorrhages, responded well to a right subtemporal decompression. However, there was pallor of the optic disks due to secondary optic atrophy, and the vision was reduced to 20/50 in the right eye and to 20/40 in the left eye. The second patient, in whom lumbar puncture revealed that the cerebrospinal fluid was under increased pressure, recovered spontaneously and had good vision and normal visual fields.

The author presents a brief review of the literature, pointing out that most reports on this condition were published in the neurological journals. Patients with failing vision or diplopia, however, may first consult ophthalmologists. The condition was first described by Nonne under the term "pseudotumor cerebri," in 1904. Other names given to the syndrome are meningoencephalitis serosa, serous meningitis, otitic hydrocephalus, or arachnoiditis, all characterized by chronic cerebral edema. A recent history of a head trauma, general infection, or otitis media is given by some patients. The true cause remains obscure. The intracranial pressure is increased, although there is no intracranial neoplasm. The onset is insidious, and the patients appear in good health. Papilledema is invariably bilateral. Headaches are frequent. Paralysis of one or both abducens nerves is common. The spinal fluid is under increased pressure, but its cell count and protein content are normal. Ventriculography reveals that the ventricles usually are small and symmetrically placed as if they were compressed by general swelling of the brain or by excessive fluid in the meninges. The visual acuity is reported to be impaired to a greater degree in pseudotumor cerebri than in elevated intracranial pressure due to a neoplasm. This syndrome usually occurs in young persons. It sometimes terminates in spontaneous recovery.

The Problem of Unilateral Amblyopia: A Preliminary Study of 10,000 National Health Patients. R. B. W. Cole. Brit. M. J. 1:202-206 (Jan. 24) 1959 [London].

Routine examination of 10,000 consecutive men, women, and children under the Supplementary Ophthalmic Service of the National Health Service disclosed that no fewer than 527 (5.27%) had unilateral amblyopia. This condition is colloquially known as "lazy eye." In 1% of all the patients examined, one eye was registrably blind, and in another 2% one eye had such poor vision as to be quite useless. In the remaining 2% of amblyopic patients the vision was so poor that binocular vision was absent. If this finding were extended to the population at large, it is apparent that, of every 100 children born, between 5 and 6 are destined to lose the use of one eye. Of the 527 amblyopic patients, 225 were male and 302 female. With an average distribution of 415 males and 585 females among 1,000 patients examined, the true sex incidence of amblyopia was 5.42% among males and 5.14% among females. There is a strong element of heredity in amblyopia, but its exact pattern is not known. Among the 527 patients with amblyopia, this condition involved the right eye in 224 (42.5%) and the left eye in 303 (57.5%). When the 527 patients were analyzed according to age groups, it appeared that in every group there was a significant number of amblyopic patients. The youngest amblyopic patient discovered was 4 years old, and the oldest was 85 years of age.

This condition of unilateral amblyopia is well known throughout the civilized world as a source of wastage of man-power in times of national emergency. Its economic and social disadvantages are equally serious, especially should anything happen to the good eye. An amblyopic patient is usually ignorant of his disability, relying unconsciously on his good eye. Unfortunately the condition develops in infancy and early childhood, and by the time the child starts school, it too often has become permanently established. Although the National Health Service offers free and comprehensive medical care of the entire population, the unexpected gap in the medical eye service, shown by the still continuing development of one useless eye in 5 out of every 100 children, is due to the fact that the first compulsory or general examination of children's eyes takes place after they have started school, when unilateral amblyopia is already well established. Early and regular ophthalmic examination of all children is indicated if this disability is to be attacked.

The Surgical Treatment of Herpetic Keratitis. M. Fine. California Med. 90:121-125 (Feb.) 1959 [San Francisco].

Corneal transplantation is at the present time the treatment of choice for controlling or terminating recurrent or chronic herpetic keratitis. Of the 48 keratoplastic operations carried out on patients with various forms of corneal herpes, 16 were performed on patients with quiescent keratitis, and 32 on patients with active keratitis. The operation brought about improvement in all but 3 patients. Recurrence of keratitis in the graft is particularly likely to occur if the visible lesion is not excised completely and if a portion of the graft border lies in contact with the diseased tissues. The reason why corneal transplantation is improving herpetic keratitis is unknown. In patients with chronic stromal herpes the removal of the necrotic corneal tissue by transplantation of cornea appeared to influence promptly and favorably the course of the disease. Even in patients in whom the transplant has not remained completely clear, the congestion of the globe was greatly relieved, often within a few days after operation, and uveitis subsided.

THERAPEUTICS

Hydrochlorothiazide in the Treatment of Congestive Heart Failure. A. N. Brest and W. Likoff. Am. J. Cardiol. 3:144-147 (Feb.) 1959 [New York].

Hydrochlorothiazide (Esidrix), a new orally administered diuretic, was given to 20 patients with congestive heart failure. In 16 of the 20 patients, the congestive failure was successfully controlled with the aid of this diuretic. Of the 16 patients, 4 had never been treated with diuretics and were given 50 mg. of hydrochlorothiazide either once or twice daily; 3 patients had been controlled only with the aid of diuretics and were given 50 mg. of hydrochlorothiazide twice daily; 9 patients had been refractory to treatment for congestive failure and were given 50 mg. of hydrochlorothiazide 3 times per day. Of the remaining 4 patients, 2 were improved, but their congestive failure was not completely controlled; 1 patient was unable to tolerate the drug because of severe nausea; and 1 patient failed to show any diuresis while receiving hydrochlorothiazide. A mild hypochloremia developed in all patients who were maintained on hydrochlorothiazide, but no significant changes in serum sodium or potassium level were observed. No deleterious hematological or renal changes occurred. The only side-effect observed was nausea, and only in one patient was this severe enough to prevent the continued administration of hydrochlorothiazide.

Evaluation of Chlorothiazide in the Diuretic Therapy of Congestive Heart Failure. L. J. Warshaw. Am. J. Cardiol. 3:167-179 (Feb.) 1959 [New York]

Chlorothiazide was administered orally to 98 adult patients with clinical evidence of fluid retention amenable to diuretic therapy; 61 of these patients had congestive heart failure, 13 had heart disease with cardiac failure precipitated by endocrine imbalance, and 24 were noncardiac patients with fluid retention secondary to endocrine imbalance. Except for 17 patients with acute decompensation, all the patients were treated on an outpatient basis. No attempt was made to standardize the dose of chlorothiazide. Most of the patients were given a single dose of 1 Gm. of the drug administered orally each morning. Many of the patients required a second dose of 1 Gm. in midafternoon. In 3 patients who seemed resistant, increased doses up to 4 Gm. daily for several days were tried, but proved to be no more effective. Chlorothiazide alone, in doses ranging from 1 to 2 Gm. daily, satisfied the diuretic requirements of 85 (87%) of the 98 patients. Patients previously maintained on mercurials administered parenterally required more frequent doses of chlorothiazide to achieve comparable results. Instances of lack of effectiveness and development of tolerance appeared to be somewhat more frequent than with parenterally administered mercurials, but much less frequent than with any other currently available, orally administered diuretic.

Chlorothiazide showed no significant local or systemic toxicity other than a few instances of gastrointestinal irritation. Low potassium levels of the blood were noted in a few patients, but none of the clinical disturbances associated with potassium depletion were seen. Chlorothiazide is a satisfactory orally administered diuretic both for the initial treatment and for the maintenance of patients with congestive heart failure. Its ease of administration does not eliminate the necessity of continued careful observation and the individualized adjustment of dosage schedules to meet each patient's changing requirements.

The Management of Congestive Heart Failure with a Free Salt Intake. I. S. Eskwith. Am. J. Cardiol. 3:184-191 (Feb.) 1959 [New York].

The author reports on 14 men and 9 women, between the ages of 26 and 83 years, with congestive heart failure who were placed on a regimen of digitalis, diuretics, and a free sodium intake. Chlorothiazide in doses of 0.5 Gm. 3 times daily for one week, and 0.5 Gm. twice daily for maintenance, was used as the mainstay of diuretic therapy, with a priming injection of a mercurial diuretic. Free salt intake was permitted. There were 2 exceptions to this general treatment scheme. A 62-year-old woman was given 2 cc. of meralluride weekly because of intolerance to chlorothiazide. A 73-year-old man had moderate intolerance to chlorothiazide and continued with only 0.25 Gm. of the drug, given twice daily. Results were excellent in 19 of the 23 patients, fair in 3, and poor in 1. Dyspnea and/or edema completely disappeared in the 19 patients who became relatively fully active. Incomplete relief of edema or dyspnea resulted in the 3 patients, or for at least 2 years they were without an attack of decompensation. Fifteen of the 23 patients had blood urea nitrogen determinations performed, which showed no evidence of renal insufficiency or progression of an existing insufficiency.

Patients appreciate the greater freedom in dietary intake they now enjoy. It is the author's feeling that restriction of sodium in the management of this syndrome is ineffective, except in the mildest cases, and that its continued use is superfluous with the diuretics now available. It is also postulated that the regimen of digitalis, chlorothiazide, mercurial injections when needed, and a free salt diet will eliminate many electrolyte disturbances now observed in patients with congestive heart failure.

Critical Considerations on Therapy with Massive Doses of Prednisolone in Patients with Malignant Hemoblastoses. J. Böhnel and A. Stacher. Klin. Med. 14:19-25 (Jan.) 1959 (In German) [Vienna].

The authors report on 9 women, between the ages of 19 and 51 years, on a 50-year-old man, and on a 7-year-old boy; 4 of these patients had acute granulocytic (myeloblastic) leukemia, 5 had Hodgkin's disease, 1 had lymphosarcoma, and 1 had carcinoma of the thymus. These patients were given an average dose of 250 mg. of prednisolone (Delta-cortril) by mouth daily for 7 to 15 days. In the patients with acute leukemia the treatment with such massive doses of prednisolone did not show any advantages as compared with that with smaller doses. The patients with Hodgkin's disease had such excellent remissions as had never been obtained with other types of therapy. This was of particular importance in patients who had become resistant to cytostatic therapy; prednisolone therapy made it possible to resume treatment with other cytostatics after intervals of weeks or even months. Temporary regression of the tumor resulted from prednisolone therapy in the patient with lymphosarcoma, and temporary subjective improvement occurred in the patient with carcinoma of the thymus. Complications of prednisolone therapy consisted of ulcer of the stomach in 1 patient and of increased hemorrhagic diathesis resulting from thrombopenia in 7 patients, 3 of whom died of cerebral hemorrhages. Physiological effects resembling those observed in patients with adrenal cortical hyperfunction (Cushing's syndrome) were observed in all the patients but were less pronounced than those occurring after prolonged cortisone therapy.

The mechanism of action of the glucocorticoids, particularly when administered in massive doses, has not been fully explained. The glucocorticoids do not exert a direct effect on the cells, but may act rather by "induced reactions and metabolites." Despite the reduced coagulation potential, thromboses may occur. Before an unequivocal explanation of the action of the glucocorticoids has been found, treatment with massive doses of prednisolone should be limited to patients with Hodgkin's disease and lymphosarcoma, who have become resistant to treatment with cytostatics and to cortisone therapy with small doses. In patients with acute leukemia the increased risk of complications outweighs by far the insignificant advantages of massive dosage.

Cycloserine and Viomycin in Combined Treatment of Pulmonary Tuberculosis: A Comparative Study. I. Ståhle. Acta tuberc. scandinav. 36:83-97 (no. 2-3) (In English) [Copenhagen].

After reviewing earlier investigations on the tuberculostatic antibiotics, cycloserine and viomycin, the author describes investigations designed to test the action of new combinations of tuberculostatics in patients with pulmonary tuberculosis. The combinations studied were cycloserine-isoniazid and cycloserine-viomycin, and the results obtained were compared with those of a third combination PAS-isoniazid. The cycloserine preparation used was cycloserine tartrate. The combination cycloserine-isoniazid was given to 28 patients, cycloserine-viomycin to 30, and PAS-isoniazid to 34.

The tuberculostatic effect, evaluated both clinically and roentgenologically, was comparable for all 3 combinations and was somewhat better for those that included cycloserine. Healing of cavities was especially good with the combination cycloserine-viomycin. The resistance of tubercle bacilli to the antibiotics could be determined only before the institution of treatment, because in all patients tubercle bacilli disappeared from the sputum quite rapidly. Initial resistance to cycloserine-isoniazid was observed in one patient who had not been treated with cycloserine previously. The tolerance for both cycloserine and viomycin was excellent, and no side-effects attributable to these antibiotics were observed. Symptoms of intolerance to PAS and isoniazid appeared in a few of the patients. The author concludes that cycloserine and viomycin are of great value in the combined treatment of patients with pulmonary tuberculosis, particularly when used together.

PATHOLOGY

Perineal Carriage of Staph. Aureus. M. Ridley. Brit. M. J. 1:270-273 (Jan. 31) 1959 [London].

Cultures were made from each nostril and 16 skin sites and press plates were taken from the front and back of the drawers of 50 medical students. By impressing an area of the inside of the drawers directly on the surface of the medium in a Petri dish with a circular wooden block, cultures were made from the perineal area. The results of this investigation showed that 26 (52%) of the students had no Staphylococcus pyogenes var. aureus in the nose or on the skin and that 13 (26%) had these organisms in the nose, generally in very large numbers, but the perineal area yielded fewer than 30 colonies from the 6 sites chosen for examination. A further 6 students (12%) had much greater degrees of contamination of the perineal area and were heavy nasal carriers as well. The remaining 5 students (10%) had an equal degree of contamination of the perineal area, but no staphylococci in the nose or only 1 or, at most, 5 colonies. Thus, sufficiently large numbers of Staph. pyogenes var. aureus were isolated from the perineal area of 22% of male adults to class them as perineal carriers.

Repeated nose and skin tests were carried out on most of the nasal and perineal carriers revealed by the initial tests. These repeated tests and additional studies showed that the carrier state may persist for months in 14% of the persons tested, that it is not due to fecal contamination alone, that the organisms are able to multiply in or on the perineal skin, that they may be of a different phage type from those found in the nose or feces, and that they may be dispersed into free air when the carrier exercises in a cubicle of plastic curtain material for 15 minutes by waving his arms about while wearing his ordinary everyday clothing.

The reported findings show that a comparatively large proportion of persons have sufficient numbers of Staph. pyogenes var. aureus on the skin of the perineum and adjacent structures to suggest that the organisms are able to colonize this area. Many of these persons have the organisms in the nose as well, while a few are primarily perineal carriers with few or none in the nose. In such persons multiplication of staphylococci on the perineum appears to be the most likely explanation for the persistence of large numbers in this site for considerable periods of time. Both the nasal vestibule and the perineal skin are areas in which large apocrine glands are found. It may, therefore, be that these glands offer a suitable environment for the survival and multiplication of Staph. pyogenes var. aureus.

Renal Papillary Necrosis: Clinical Study of 14 Patients. J. Jornod. Helvet. med. acta 25:669-693 (Dec.) 1958 (In French) [Basel, Switzerland].

Fever, prostration, nausea, and pain in the lumbar region were the most frequent, but not uniform, symptoms of renal papillary necrosis in 14 patients in whom the disease was diagnosed on autopsy. The observed biochemical changes were normochromic anemia, high white blood cell count, increased erythrocyte sedimentation rate, low serum cholesterol level, fat infiltration of the liver, elevated glycemia not necessarily related to diabetes, and symptoms of acute renal insufficiency. Frequent instances of pyuria and isosthenuria were accompanied by occasional recordings of slight albuminuria and slight hematuria. Roentgenologic findings, such as enlarged and extended calyces, hollow shadows, and contracted rings, may have suggested the presence of renal papillary necrosis, although the diagnosis must be complemented or confirmed by microscopic examination of the urine or by surgery. The histological findings disclosed necrosis of the renal papillae, being mostly a bilateral condition. This process is limited by the infiltration of leukocytes and is associated with interstitial nephritis. Its pathogenesis is attributed to hemodynamic and histochemical disorders, which are not yet understood. The disease has no sex or age group preference. A differential diagnosis of renal papillary necrosis should be made with acute pyelonephritis, acute renal insufficiency accompanied by anuria, infarction of the kidney, hematuria, thrombosis of the renal vein, renal or ureteral lithiasis, renal tumor, and tuberculosis.

Medical treatment of renal papillary necrosis is delusive. Surgical treatment (nephrectomy) is contingent on an early diagnosis of the disease, on the general state of the patient's health, and on functional integrity of the other kidney. Prophylaxis of renal papillary necrosis is based on the treatment of infections of the urinary tract and on the treatment of conditions which predispose to the development of these infections, such as malformations of the urinary tract, enlarged prostate, and the presence of diabetes mellitus.

Relation Between Systemic Histiocytic Sarcomatosis and Leukemia: Consideration of Two Instances Classified as Leukosarcomatosis. P. C. Gamalero and E. Segagni. Minerva pediat. 10:1491-1498 (Dec. 15) 1958 (In Italian) [Turin, Italy].

The authors observed in 2 boys, aged 7 and 8 years, respectively, the onset and progressive course of lymphosarcomatosis, followed by fatal lymphocytic leukemia. The mother of the younger boy had disorders of the pituitary body. This boy began to have intermittent febrile episodes a month before hospitalization. On admission, a mass, diagnosed as a lymphoma, was roentgenologically observed in the mediastinum. Histological examination of a resected enlarged right axillary lymph node revealed the presence of lymphosarcomatosis. Examination of the peripheral blood and the sternal puncture showed no pathological change. The older boy had had a suppurative inguinal lymphadenitis on the right 2 years before admission. In addition to pallor, he developed cough, intermittent fever, and enlarged cervical, axillary, and inguinal lymph nodes a month before admission. Examination at the time of admission revealed enlarged spleen (on inspection) and enlarged lymph nodes in the mediastinum (on roentgenologic observation). Histological examination of a peripheral lymph node suggested the diagnosis of lymphoreticulosarcoma. Morphologic examination of the peripheral blood revealed the presence of lymphocytosis. Sternal puncture disclosed the existence of reticular lymphoid cells.

A combination of drug therapy (corticotropin), blood transfusion, and antihemorrhagic treatment, followed by a course of roentgenologic therapy, brought temporary relief to the 2 patients. But a fatal clinical picture of acute lymphoid leukemia of short duration appeared in both boys shortly after completion of the x-ray therapy. This clinical picture (known as leukosarcomatosis) is a contribution to the theory that postulates a pathological nexus between the appearance of sarcomatous neoplasm of the lymph nodes and the subsequent development of acute leukemia.

Staphylococcal Septicaemia. J. E. Hassall and P. M. Rountree. Lancet 1:213-217 (Jan. 31) 1959 [London].

This report is based on 86 cases of generalized staphylococcic disease that occurred during the 8 years from 1950 to the end of 1957 at the Royal Prince Alfred Hospital in Sydney, Australia. In this large hospital, generalized staphylococcic infection occurring in patients after admission with other illnesses was not a problem before 1952. Since then numerous cases have occurred. The number of patients admitted with staphylococcic septicemia has also increased sharply since 1954. Study of the histories of the patients, and sometimes of the phage type of Staphylococcus organisms isolated, placed the patients in either the group infected outside the hospital (46) or the group who acquired their infection in the hospital (40). The criteria for diagnosis of generalized infection with coagulase-positive staphylococci included one or more of the following: (1) clinical evidence of generalized infection, together with culture of the organisms from one or more sites; (2) growth of organisms from blood culture; and (3) pyogenic lesions of the internal organs found at autopsy, together with culture of the organisms from these lesions or from the blood.

Of the 40 patients who were infected in the hospital, 31 died. The infecting staphylococci belonged to only a few phage types. These infections started in 1952, and all followed surgery, intravenous therapy, or the exhibition of cortisone. Of the 46 patients who acquired their infections outside the hospital, 19 died. Up to 1954 there was an average of 2 such cases each year, but the incidence rose notably in the 3 following years. This increased incidence was due almost entirely to infections with strains of phage type 80/81. In 1957 the mortality rate in both categories of patients fell. This decline coincided with keener awareness of the problem of staphylococcic cross infection, earlier diagnosis of septicemia, and intensive treatment with effective antibiotic combinations.

PUBLIC HEALTH

Cancer and Bronchitis Mortality in Relation to Atmospheric Deposit and Smoke. P. Stocks. Brit. M. J. 1:74-79 (Jan. 10) 1959 [London].

Residents in large towns of England and Wales have always been subject to higher death rates than country dwellers. Two diseases for which the urban excess is pronounced are bronchitis and lung cancer, and this is so in some regions for gastric cancer, whereas cancers of the intestine and breast show little relation to urbanization. Atmospheric pollution of the kind found in British towns has been under suspicion as a causative agent both for bronchitis and for lung cancer, and the author suggests that pollution of food by exposure to dirty air might be a cause of the higher incidence of gastric cancer in towns. He describes an attempt to obtain more conclusive evidence on these points by relating standardized mortality from bronchitis and cancers of 4 sites, with measurements of atmospheric deposit and suspended matter (smoke), in the county boroughs of England and Wales and in the administrative areas of Lancashire and the West Riding of Yorkshire, where such measurements have been made.

Throughout his report the author refers to the standardized mortality ratio (S. M. R.), which means 100 times the actual deaths of residents in an area divided by the number which would have occurred if the death rates at each age had been the same as the rates for England and Wales as a whole. He found that, when the S. M. R.'s for bronchitis and cancers in the county boroughs of England and Wales are related to the average amounts of undissolved deposited matter and smoke from the air in towns, highly significant statistical correlations are found for bronchitis and lung cancer with both types of pollution after eliminating the effects of population density on the correlations. In all administrative areas in Lancashire and the West Riding of Yorkshire having the necessary pollution data, bronchitis is significantly correlated with deposit but not with smoke, while for lung cancer the reverse is the case. In Lancashire areas lung cancer is strongly correlated with population density in adjacent districts even when that of the area itself is held constant, and this appears to confirm the effect of wind-borne smoke on the incidence of the disease.

Stomach cancer mortality is related significantly with both undissolved deposit and smoke in the county boroughs, and among women in the Lancashire and Yorkshire districts also, whereas breast cancer shows negative correlations in the county boroughs and no relation with air pollution in the counties. The most likely explanation of this is the exposure of food to dirty air, and this hypothesis is supported by the fact that in the United States, where wrapping of food was the rule long before it began to be practiced in Britain, death rates from stomach cancer have fallen steadily in contrast to their lack of improvement in Britain. Intestinal cancer also shows small correlations with deposit and smoke in the county boroughs, but these correlations are below the conventional level of significance.

Admission of Patients with Alcoholism to General Hospitals in New York State. I. J. Brightman, C. M. Royle, B. Ferber and others. New York J. Med. 59:237-247 (Jan. 15) 1959 [New York].

The authors made a survey in New York State of general hospital policies in regard to admission of patients with a primary diagnosis of alcoholism. Of 356 general hospitals to which a questionnaire was mailed, 315 returned the appropriate forms answering the questions. About 20% of voluntary general hospitals and 35% of public general hospitals indicated that their policies provided for the admission of alcoholic patients. Only 9% of proprietary general hospitals admitted such patients. Only 50% of the nonadmitting hospitals stated that their regulations precluded their accepting alcoholic patients. About 40% of the admitting hospitals found the patients to be not too troublesome, and almost all found that tranquilizing drugs were particularly helpful. A surprisingly large proportion of alcoholic patients paid for part or all of their care or had such payments made in their behalf. The figures present a state-wide picture only, and it may be expected that there will be much variation when the situations are studied on a community base. It is hoped that the communities will study their local problems and attempt to encourage the admission of alcoholic patients to general hospitals, if this policy has been deficient in the past. A comparable study of proprietary hospitals for nervous and mental diseases indicated that 15 out of 16 admitted alcoholic patients.

Five Years' Experience with Fluoridation in Norway, Maine. A. H. Garcelon. New England J. Med. 260:127-129 (Jan. 15) 1959 [Boston].

The town of Norway, Maine, began fluoridating its water supply on Oct. 17, 1952. An earlier report presented evidence that beneficial effects began to become apparent in children, 6 to 9 years old, within 30 months after fluoridation was started. The present study was designed to determine what effects fluoridation had on the permanent teeth of children, 6 to 14 years old, who used the fluoridated water supply continuously for the first 5 years after fluoridation was started. Between 1952 and 1957, the average numbers of decayed, missing, and filled permanent teeth were reduced by more than half among the children, 6 to 9 years of age, by more than a quarter among the children, 10 to 12 years of age, and by about a tenth among those, 13 and 14 years old. During the same interval, the percentage of children, 6 to 9 years old, who were entirely free of dental decay in permanent teeth more than doubled.

Except for one group, which was too small, the differences in rates are all statistically significant. Hence, children, 6 to 14 years old, who used the fluoridated water supply continuously after fluoridation was started received significant benefits from the first 5 years' fluoridation, even though in some of them many of their permanent teeth had erupted before fluoridation began. Since the maximum benefits of fluoridation occur when the fluoride is incorporated in the tooth enamel while it is being formed, the younger children, who had more of their teeth formed under fluoridation, received greater benefit than the older children. Since the beneficial effects continue undiminished throughout life once the decay-inhibiting effect is established, as succeeding generations are brought up on the fluoridated water supply, an increasing proportion of the population of Norway, Maine, will benefit from fluoridation.

BOOK REVIEWS

Cardiac Arrest and Resuscitation. By Hugh E. Stephenson Jr., M.D., Professor and Chairman, Department of Surgery, University of Missouri School of Medicine, Columbia. Cloth. $12. Pp. 378, with 31 illustrations. C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1958.

Considering the importance of the subject of cardiac arrest and resuscitation it is surprising that this is the first comprehensive monograph to be written about it. It is not surprising that its editor should be Dr. Stephenson, since no one man has shown a more intense interest in the subject. He has been helped in this effort by several authoritative contributors. The book is all-inclusive, with chapters on history, incidence, etiology, diagnosis, management, prevention, complications, and prognosis. The author is to be commended for including a chapter on the care of the patient in the postresuscitative period, as this phase of the subject has been neglected. He has not, however, given hypothermia the emphasis it deserves as a means of preventing permanent neurological defects. Of added interest also are the chapters on the medicolegal aspects of cardiac resuscitation and elective cardiac arrest in open-heart operations. This book should be a welcome addition to the library of any surgeon. The chapter on the prevention of cardiac arrest is especially worthwhile.

The English Health Service: Its Origins, Structure, and Achievements. By Harry Eckstein. Foreword by James Howard Means, M.D. Harvard political studies published under direction of Department of Government in Harvard University. Cloth. $5.50. Pp. 289. Harvard University Press, Cambridge 38, Mass.; Oxford University Press, Amen House, Warwick Sq., London, E. C. 4, England, 1958.

This volume describes and evaluates the origins and 10 years' performance of England's National Health Service (NHS). The unplanned growth of medical care is traced from the poor laws of the 1830's through the compulsory health insurance of 1912 to the present arrangement. The conditions existing prior to enactment of the National Health Service and allegedly necessitating its introduction are characterized as "deplorable" on the testimony of the Collings Report. The proclaimed objectives of the NHS were to increase the supply of medical services and to rationalize the system. As achievements of the NHS the author cites geographical redistribution of physicians and, to a lesser extent, hospital facilities; an increase in the number of physicians and apparent improvement in their financial security; and at least no deterioration in doctor-patient relationships.

The author condones the shortcomings of the NHS in part because of the shortage of all kinds of resources to meet Britain's postwar needs. The shortcomings include negligible expansion of hospital facilities—"only 3,000 beds represent an absolute increase in capacity" by 1955 and "capital expenditures on hospitals in 1952-53 were only 32 per cent of those in 1938-39 [in real values]"; aggravation of this condition by abuses of the NHS; and lack of coordination and cooperation between isolated regional hospital boards and particularly between many local authorities, hospitals, and general practitioners. The author doubts that the well-known defects of multilevel bureaucracy under one powerful minister have modified the practice of medicine, although he admits, for example, that the method adopted to classify procedures has resulted in paying surgeons more for an easy operation than for a difficult one.

Physicians' dissatisfaction with the remuneration under the NHS is well known. The author seems too disposed to attribute shortcomings of the NHS to the "deplorable" preexisting conditions. He does not adequately define his tests and criteria of evaluation. Data are not plentiful, and he does not seem to have considered any other alternatives to either the preceding or the present system. We admit that socialization appears to be an irreversible process, but some modifications would seem to be conceivable. His discourse on planning (in the epilogue) is inappropriate, revealing shortcomings in his understanding of a market economy as well as a decided preference for planning. Although he found rational action lacking under a "rational system," using the NHS as a test, he still urges planning of an imperfect variety. His additional recommendation that the Minister of Health "go on a spending spree" reveals another bias.

One of the most profound issues, "whether there can be any price system at all (in the classical sense) in such areas as medicine," is relegated to a footnote. The author apparently does not know of "opportunity cost," yet it is well known that when the price of one item of consumption is reduced to zero, overconsumption inevitably results. To the extent that satisfaction of additional (free) health wants is less valuable to the British citizenry than that of the nonhealth wants consequently foregone, the NHS is costly indeed. Moreover, when varied wants are equalized through zero price, the less valuable may be satisfied (through spectacles and dentures) prior to the more valuable (through new health centers). For these reasons the author's efforts to demonstrate that the system is not costly

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These book reviews have been prepared by competent authorities but do not represent the opinions of any medical or other organization unless specifically so stated.

are superfluous and unconvincing. The definitive study of England's National Health Service is yet to be written.

Comprehensive Medical Services Under Voluntary Health Insurance: A Study of Windsor Medical Services. By Benjamin J. Darsky, M.A., Nathan Sinai, Dr.P.H., and Solomon J. Axelrod, M.D., M.P.H. Bureau of Public Health Economics, School of Public Health, University of Michigan, Ann Arbor. Cloth. $7.50. Pp. 392, with illustrations. Harvard University Press, Cambridge 38, Mass.; Oxford University Press, Amen House, Warwick Sq., London, E. C. 4, England, 1958.

Comprehensive physicians' services can be provided under voluntary health insurance sponsored by a local medical society on a fee-for-service basis. This conclusion is based on the study of Windsor (Ontario) Medical Services (WMS), Inc., made in 1954 under a grant from the Health Insurance Foundation by the Bureau of Public Health Economics of the University of Michigan. The recent growth of a series of experiments providing for the payment of physicians' services outside the hospital under different Blue Shield and other voluntary health insurance plans makes this first large-scale study of the operation of a similar plan of great interest. The report provides detailed information on the background and organization of the WMS; the use of physicians' home and office services, and services for hospitalized illnesses; the attitude of the public and the local medical profession toward the plan; the physician-patient relationship under the WMS; claim administration; and the effects of the plan on medical practice in Windsor.

On the basis of a survey of the Windsor population and physicians, and a survey of records, it was concluded that the medical profession and the subscribers support and approve WMS; WMS is financially stable and administratively sound; both the physician and the patient are satisfied with the method of control; and medical care is "adequate and sound," with the subscribers to WMS initiating care more frequently than other people in the community. The value of this pioneer effort in research is hampered by the limitation of the study to the techniques of the social scientists. Judgments on medical care were made on the basis of replies to questionnaires by both patients and physicians, and not on the basis of the medical management of cases. As a basis for comparison with future studies, the bench marks used (services provided by physicians) may be of limited applicability. The nature of medical care is constantly improving. Services that had meaning at one time may not be of such great value a decade later. What comparisons can future physicians make with these service bench marks?

Although the WMS does not include payment for direct hospital charges, the authors found the use of the hospitals was slightly greater than for non-WMS members. Similar differences were found in studies of the Saskatchewan Health Services Plan, but studies in New York City by the Health Insurance Plan showed that hospital use was less under their plan than under a plan providing Blue Shield coverage. What caused these differences between the United States and Canada? Was it chance, or something inherent in the practice of medicine in certain areas of Canada? The present study, unfortunately, does not provide analysis of the critical points of variations and differences that evolved in the Windsor area. A great deal of comparison is made between the persons with WMS and those covered by other plans. One area of interest would have been an analysis of the premiums paid by those enrolled in other plans. The reader does not learn whether the scope of services provided under the WMS was a reflection of higher premiums paid by subscribers or due to the inherent nature of the operations of WMS. As with every research study, some flaws may be found, but the book provides a clear and reasonably complete exposition of the history and administration of a voluntary health insurance plan providing comprehensive physicians' services.

Progress in Medical Virology. Volume I. Edited by E. Berger and J. L. Melnick. Cloth. $11.50. Pp. 304, with 44 illustrations. Hafner Publishing Company, 31 E. 10th St., New York 3; S. Karger AG., Arnold Böcklinstrasse 25, Basel, Switzerland, 1958.

Despite the recent proliferation of various biological publications there is ample justification for a review series on the medical aspects of virology. Such a publication should keep clinicians and clinical investigators informed of advances in fundamental virology and should summarize and correlate the literature of viral disease. The editors seem to have had these objectives clearly in mind when planning this first volume in a projected series. On the fundamental level there are articles dealing with the structural and functional aspects of virus particles and the significance of persistent virus infections in tissue culture. Of more direct interest to the clinician are the reports on the 1957 pandemic of influenza and the critical review of the techniques used in preparing and evaluating poliomyelitis vaccine.

The editors have gone out of their way to obtain a truly international representation. There are articles from South Africa, the U.S.S.R., India, England, and the United States. With the wealth of material available in modern virological studies, and the ever-growing variety of virus diseases, it is difficult to understand the inclusion of articles which are redundant to the extent that several are concerned with similar diseases. Thus there are two articles dealing with diseases caused by the Russian spring-summer complex of viruses. There is also one article on the enteroviruses, including considerations of the clinical features of Coxsackie virus infection and another on neonatal myocarditis caused by the same virus. The redundancy is largely at the level of the subject material and not the content. A single efficient review article might have permitted the inclusion of a greater variety of topics.

The quality of the articles is uneven. Colter's review of nucleic acids and viral infectivity performs a useful service in collating pertinent information from animal, plant, and bacterial viruses. He enlivens his article with a critical consideration of some of the controversial topics in this snowballing field. Another rapidly growing field, that of persisting virus infection in tissue culture, is reviewed by Ginsberg. The potential importance of these investigations as a model for understanding the role of "latent" virus infections in man needs little emphasis. It was disappointing, however, to find no reference to the careful work of Vogt and Dulbecco, which perhaps contributed more than any other study to our understanding, at a cellular level, of the mechanism by which a virus persists in at least one of the carrier culture systems. It is perhaps even more difficult to understand the omission of any reference to the venerable but growing literature on the continuous production of tumor viruses by infected cells in vitro.

Melnick provides a thorough picture of the enteroviruses, including their fundamental physical and biological characterization as well as their clinical and epidemiologic significance. This article might serve as a prototype for future articles in the series, although few are as qualified as the author to present such a multifaceted picture. McClean and Taylor's article on poliomyelitis vaccine is an instructive analysis of the various steps involved in its manufacture from growth of the virus through inactivation and safety and potency testing. They make a convincing case for the technique of combined ultraviolet light and formalin inactivation of poliovirus. Their method for improving the safety test by simply increasing the volume of fluid tested per tissue-culture bottle is unconvincing in the absence of some supporting data. For instance, we know that if the volume of inoculum on a monolayer is increased beyond a certain point, the virus is not efficiently adsorbed.

It is difficult to understand the inclusion of Smith's article on virus flocculation reactions. The likelihood that these will replace the standard diagnostic tests now in use appears miniscule despite Smith's arguments to the contrary. The space might better have been used for a review of the practicable techniques available today. This criticism is not meant in any way to detract from the potential usefulness of the flocculation techniques in fundamental investigations of the nature of viruses. The paper on the Asian influenza epidemic is a welcome and highly competent review of a subject of great importance. The rest of the articles are best characterized as competent. The books suffers seriously from the absence of an index. A detailed table of contents preceding each article would also be useful. There is a disconcerting number of typographical errors in the text, and the quality of the binding, considering the price, is not impressive. Nevertheless, the series promises to fill an important need, and the succeeding issues are anticipated with the hope that criticisms will be taken kindly and to heart.

Poisoning by Drugs and Chemicals: An Index of Toxic Effects and Their Treatment. By Peter Cooper, F.P.S. Cloth. 25 *shillings*. Pp. 209. *Alchemist Publications*, *Thomas Waide* & Sons, Ltd., 25 Oxford St., London, W. 1, England, 1958.

This handbook is a compilation of 350 monographs on potentially toxic drugs and chemicals. The monographs were developed from an extensive collection of case reports of accidental poisoning and information from standard reference books on pharmacology and clinical and industrial toxicology. Each monograph includes a list of synonyms; concise notes on dosage, pharmacological action, toxic effects, and possible effects of massive overdose; suggestions for treatment; and simple aids for identification of the toxic substance. Occasionally abstracts of published cases are included. An appendix provides first-aid measures for the emergency management of poisoning, and a comprehensive index lists generic, proprietary, chemical, and common names. One of the particular merits of a book of this type is its brevity and clarity. By summarizing pertinent facts, it provides the concise and precise information required in poisoning emergencies.

Obstetric and Gynecologic Milestones: Essays in Eponymy. By Harold Speert, M.D., Assistant Professor of Clinical Obstetrics and Gynecology, Columbia University College of Physicians and Surgeons, New York. Cloth. $15. Pp. 700, with illustrations. The Macmillan Company, 60 Fifth Ave., New York 11; Brett-Macmillan, Ltd., 132 Water St., S., Galt, Ontario, Canada, 1958.

Most of the chapters in this delightful book are devoted to one historic person. The sections deal with anatomic parts and landmarks; measurements; clinical signs, tests, and rules; phenomena of pregnancy and labor; bacteria; ovarian tumors; syndromes; positions, instruments, and operations; and therapeutic procedures. It is well indexed. Every obstetrician and gynecologist should be delighted by the book, both for its historic value and as a reference work. There are many original illustrations and portraits. From the beginning of history men's names have become part of our language, often to the point where they are spelled with small letters. Every science and art contains these eponyms, which are a tribute to the men involved. The author states that the use of proper names in anatomy has long been disputed, and in 1855 a commission could not agree and compromised by allowing their retention in brackets after the objective Latin names. Their fate was to be decided by time and general usage. Such terms as eustachian tube, Glisson's capsule, and circle of Willis are too deeply entrenched to be uprooted.

The book is a compilation of essays, about half of which have been previously published in journals, so it is more or less a chronological record of the development of obstetrics and gynecology. Each chapter gives some history and background concerning the subject under discussion. Many of the feuds and conflicts concerning contemporary names with original prints, excerpts, and translations of original texts are shown. The intentness, precision, and thoroughness that some of the early men of medicine demonstrated is discussed. The accuracy of the material is praiseworthy, and the controversies seem to be presented in an unbiased fashion. In general these men were broadly educated and were often heads of such departments as physics or chemistry before assuming the chair of medicine. Many were young when they received the Doctorate of Medicine. Whether the use of eponyms in medicine is good or bad is debatable, but unless a man's name is attached to an instrument, disease, or anatomic part he is soon forgotten. Famous men, dead less than five years, are unknown to today's young physicians. This excellent book promises many years of rewarding reading.

Surface and Radiological Anatomy for Students and General Practitioners. By A. B. Appleton, W. J. Hamilton, and Ivan C. C. Tchaperoff. Fourth edition by W. J. Hamilton, M.D., D.Sc., F.R.S.E., Professor of Anatomy in University of London at Charing Cross Hospital Medical College, London, and G. Simon, M.D., B.Ch., D.M.R.E., Demonstrator of Radiological Anatomy in Medical College of St. Bartholomew's Hospital, London. Cloth. $9.50. Pp. 355, with 416 illustrations. Williams & Wilkins Company, 428 E. Preston St., Baltimore 2, 1958.

The new edition of this well-established textbook by an anatomist and a radiologist emphasizes the dynamic and functional aspects of topographic and radiologic anatomy. By the use of radiology the reader is given a clear picture of body structure as it appears in the living subject. The value of radiology in the teaching of gross anatomy is generally accepted in medical schools. This book should be useful to the student of anatomy, as it correlates topographic and radiologic anatomy by parallel illustrations of surface contours and reproductions of radiographs of the underlying structures. This edition has been extensively rewritten, revised, and rearranged. The subject matter is organized on a regional basis with separate chapters devoted to general anatomy and methods, upper limbs, chest and back, head and neck, vertebral column, and lower limbs. The text is liberally illustrated with excellent radiographic reproductions, photographs, line drawings, and diagrams. By extensive use of illustrations the authors provide a means of coordinating radiologic anatomy with surface landmarks determined by external examination and those details which can be determined only by dissection. This excellent, well-illustrated textbook is strongly recommended to undergraduate and postgraduate medical students and to students in such fields as x-ray technology, physical therapy, and physical education.

Emergency War Surgery: U. S. Armed Forces Issue of NATO Handbook Prepared for Use by the Medical Services of NATO Nations. United States Department of Defense. Cloth. $2.25. Pp. 411, with 18 illustrations. Superintendent of Documents, Government Printing Office, Washington 25, D. C., 1958.

As stated in the first chapter the purpose of this pocket-sized manual is to present "the principles and techniques of emergency care of casualties through the first three echelons; that is, the battalion aid station, the clearing station, and the field or evacuation hospital." The problems of definitive care of injured patients are excluded. The handbook is written in a clear, concise, and comprehensive manner which should enable it to fulfill its purpose in a most satisfactory manner. In addition, with a few modifications, this handbook should be useful to the civilian surgeon faced with the problem of caring for civilian injuries.

The contents are divided into four parts: The first deals with types of wounds and injuries, the second with response of the body to wounding, the third with general considerations of wound management, and the fourth with regional wounds and injuries. In addition, a glossary of drugs with national nomenclatures and several useful tables are included in the appendixes. There are excellent chapters on missile wounds, burns, cold injuries, crush injuries, blast injuries, chemical injuries, and radiation injuries. The management of patients with the various conditions considered is sound, and a section at the end of each chapter is devoted to the management of mass casualties. Problems of sorting patients with single and multiple injuries are well presented. The section dealing with regional wounds and injuries is particularly well done.

In some areas the civilian surgeon must greatly modify his approach to the injured patient from that presented in the NATO handbook. For example, he should be mindful of the fact that civilian missile injuries are generally of a much lower velocity than those of battle wounds; consequently, débridement of missile tracts must be more conservative. Similarly, in dealing with intestinal injuries, the civilian surgeon is permitted to take a more conservative approach. As a means of acquainting the newly commissioned military surgeon with the management and methods of evacuation of casualties, this volume should find a field of great usefulness, and, considering its size, the extent of detail is remarkable.

QUESTIONS AND ANSWERS

LEUKEMIA AFTER IRRADIATION

To the Editor:—*A 37-year-old man with rheumatoid spondylitis was treated with deep x-ray therapy. In 1946 he had a total of 1,600 r to both sacroiliac joints over a period of four weeks. In 1947 he had a total of 1,200 r divided equally over the cervical, thoracic, and lumbar portions of the spine. Is the development of leukemia in this man a foregone conclusion? If not, what are his chances of developing leukemia?*

Edward J. Novak, M.D., Tuckerman, Ark.

Answer.—In some patients leukemia does occur after exposure to ionizing irradiation, but, as Warren (*J. Mt. Sinai Hosp. New York* 24:1331, 1957) said, "Radiation is not the sole factor in production of the disease." The fear of leukemia developing after irradiation of the spine is founded mainly on the report of Court-Brown and Doll (Leukaemia and Aplastic Anaemia in Patients Irradiated for Ankylosing Spondylitis, Medical Research Council, Special Report Series, no. 295, London, Her Majesty's Stationery Office, 1956), who noted that there was an appreciable incidence of leukemia in veterans treated by x-ray over a prolonged period for ankylosing spondylitis. These findings, however, have not been observed by others using similar methods of therapy. In those patients in whom leukemia was noted, it followed long periods of exposure, often repeated, to x-ray. In the past 35 years, this consultant has treated with x-rays many patients who had arthritis, and leukemia subsequent to this treatment has not been observed. In the patient under discussion, the dose of x-ray given was not excessive or beyond usual therapeutic limits. Treatment was not persistent, and there was an appropriate interval between treatments. It is, therefore, not a foregone conclusion that this man will develop leukemia, nor is the chance of his developing this disease very likely.

AMEBIC GRANULOMA

To the Editor:—*How should amebic granuloma of the cecum be treated?* *M.D., Texas.*

Answer.—No information is given in the question regarding age, sex, signs, and symptoms referable to a particular patient. It is, therefore, assumed that information of a general nature is being sought. Amebic granuloma (ameboma) is a rare complication of intestinal amebiasis. It is usually single and consists of a firm, nodular mass with a fibrous outer wall. It may be well localized, involving a small area of the colon, or it may occupy an extensive segment of the large intestine and contiguous tissues. The intestinal wall may be greatly thickened. The mass consists usually of an inner zone made up of necrotic tissue containing red and white blood cells, fibrin, and amebas and associated with varying degrees of sloughing; a middle zone formed principally of granulation tissue with profuse chronic inflammatory elements and superficial or deep abscesses containing few or many amebas; and a completely fibrotic outer zone. Amebomas occur most commonly in the cecum and rectum. Spicknall and Peirce (*New England J. Med.* 250:1055, 1954) gave the location of 230 amebomas in 197 cases as follows: cecum, 40.9%; ascending colon, 3.1%; hepatic flexure, 2.2%; transverse colon, 9.5%; splenic flexure, 2.2%; descending colon, 1.7%; sigmoid, 5.2%; rectum and anal canal, 26.5%; and no location given, 7.4%. Carcinoma of the colon is the most important lesion to be distinguished from ameboma. The two may coexist. Appendiceal abscess, diverticulitis, actinomycosis, benign tumor, tuberculous enteritis, regional enteritis, and other conditions in which a mass may be associated with diarrhea should be considered in the differential diagnosis.

No single drug should be used in the treatment of ameboma. The following combination of antiamebic and antibacterial drugs is likely to give the best results: emetine hydrochloride, 0.06 Gm. intramuscularly, given once daily for not more than five days, together with chloroquine phosphate, one 0.25-Gm. tablet, given four times daily on the first day and thereafter twice daily for a total of 21 days. In patients in whom a differential diagnosis between ameboma and another inflammatory lesion cannot be made conclusively or in whom ameboma is associated with bacterial infection, emetine treatment should be followed by therapy with chlortetracycline or oxytetracycline, 0.25 Gm., given four times daily for 10 days simultaneously with chloroquine. The chloroquine therapy may be followed by a course of glycobiarsol therapy, 0.5 Gm., given three times daily for 10 days, or with diidohydroxyquinoline, 0.5 Gm., given four times daily for 20 days, to eradicate the associated intestinal infection. In most patients the

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above regimen will cause the disappearance of the lesion within a month of the beginning of treatment.

USE OF GLUCOCORTICOIDS

To the Editor:—*This dispensary treats a number of patients with allergic rhinitis and bronchitis, chronic disabling conditions for which treatments are generally unsatisfactory. In some patients the results are poor, there are unpleasant and even dangerous side-reactions, or high probabilities exist that long-continued treatment will produce an unfavorable patient-treatment relationship through the appearance of refractoriness or sensitization. The glucocorticoids have offered some hope of solving this problem, for they are extremely potent and can in some cases be used locally, thus avoiding some of the side-reactions. They are appearing in such bewildering variety, however, that it is hard to keep up with them. With each new product the general practitioner wants to know not only its side-reactions but also its proclivity for changing the patient, or the disease, into a less manageable state with this or related drugs and, particularly, how such side-reactions or proclivity are affected by use of the agent locally, such as in nose-drops or inhalation spray. One reason this is hard to decide is that the manufacturers seem to devote little attention to such items. Since this area is somewhat isolated and large medical libraries are not readily accessible, please recommend a recent, general evaluation of the glucocorticoid drugs with regard to the long-term management of allergic conditions, insofar as these can be distinguished from rheumatic conditions.* *M.D., California.*

Answer.—The glucocorticoids are generally considered to be of unequivocal value in affording symptomatic relief in patients with allergic diseases of the nasal or bronchial mucosa that are resistant to the usual forms of treatment. Their widespread use is limited, however, by the fact that they merely control the symptoms without attacking the underlying cause and by the high incidence of undesirable side-effects that they elicit. Attempts have been directed toward preparing new compounds with powerful anti-inflammatory properties and free from deleterious actions, but so far these have met with limited success. Prednisone and prednisolone are more potent on a weight of drug basis than cortisone and hydrocortisone and cause less sodium retention and potassium depletion, advantages in the treatment of patients with hypertension or heart disease. The incidence of other side-effects, however, is not appreciably reduced. Methylprednisolone, triamcinolone, and dexamethasone are even more powerful than prednisolone and prednisone, but they have not been used long enough to establish whether they offer a more favorable therapeutic ratio. Preliminary reports indicate, for example, that triamcinolone may give rise to weight loss, profound muscular weakness, and cutaneous erythema, effects that have not been observed with the other steroids. Fludrocortisone has about 25 times the anti-inflammatory action of cortisone but is such a potent sodium-retainer that it can only be used topically for the management of allergic conditions; even then, sufficient absorption may occur to produce sodium retention and edema. Local use of steroids, by inhalation or instillation, has been shown to be effective in the treatment of such conditions as bronchial asthma and allergic rhinitis. Prednisone and prednisolone, being water soluble, permit nebulization. Hydrocortisone and cortisone must be administered as a powder or in the form of a suspension. The advantage of this route is that much smaller amounts of the drugs are required. Systemic absorption is, therefore, limited in degree, and the cost of the drugs is reduced. Few long-term studies have been reported.

There is little information concerning the development of refractoriness to steroids in the treatment of such conditions as asthma and allergic rhinitis. Some investigators have reported lessened effectiveness in the relief of hay fever in subsequent seasons, but this is not a uniform finding. Others report a definite loss of activity with continuous use of steroids in asthma, but again there appears to be wide individual variation in this respect. Patients may become habituated to steroids after prolonged use, so that withdrawal becomes a problem even if the patient is seemingly deriving no benefit from the drug. There is no evidence that the steroids render other types of therapy any less effective. In fact, patients who have failed to respond to such preparations as epinephrine or aminophylline prior to steroid therapy may respond to these drugs after alleviation of their symptoms with steroids.

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EXCHANGE TRANSFUSIONS

To the Editor:—*How are donors chosen for exchange transfusions? The serum of the donor chosen for the first transfusion of a group O, Rh-positive baby with a group O, Rh-negative mother was crossmatched with the mother's serum. The second pint of blood, used from another donor and crossmatched with the mother's serum, was found incompatible in minor crossmatch—the donor's blood was not crossmatched with the baby's blood. If more than one pint is used, should the donor's blood be crossmatched with both mother's and baby's blood? If the blood is found incompatible in any phase, should that donor be rejected?*

William E. Arbuckle, M.D., Indianapolis.

Answer.—In general, newborn babies are incapable of forming antibodies, and any antibodies present in their serum represent maternal antibodies passively acquired by placental transfer. This permits a wide latitude in the method of selecting donors for treating erythroblastotic babies by exchange transfusion. In the typical case of erythroblastosis fetalis, where the mother is Rh-negative and the baby Rh-positive, Rh-negative donors must be used for the exchange transfusion, because Rh-positive blood can react with the maternal Rh antibodies present in the baby's blood. Wiener and Wexler prefer to use Rh-negative donors of the mother's A-B-O group. The advantage of this is that the donors can be selected before the baby is born and the mother's serum can be thoroughly checked during the antenatal period for its content of abnormal isoantibodies. If the mother's serum contains no abnormal isoantibodies other than anti-Rh_0, there is no valid reason why Rh-negative donors of the mother's A-B-O-group cannot be used even without crossmatching. There need be no hesitancy giving group A blood to a group O baby when the mother belongs to group A, because the baby's serum will have no alpha antibodies and such blood will survive in the baby's circulation as long as group O blood.

If crossmatching tests are done, only the major match is essential, because the baby's red blood cells are going to be removed by the exchange transfusion in any event. Since any antibodies the baby may have are derived from the mother, the mother's serum should be used for the matching test if this is done, and this has the additional advantage that the mother's serum is easier to obtain than the baby's. It is not clear why a minor crossmatching test was made in the case described or why any incompatibility should have been detected in the minor crossmatch, since the donor and mother were both group O and Rh-negative. Most likely the reaction obtained was an artifact such as is not common in these tests, though the possibility that the donor's serum contained an irregular isoagglutinin, such as anti-P, cannot be excluded. In any event, the reaction in the minor crossmatch should not necessarily disqualify the donor.

Most workers prefer to use donors of the baby's A-B-O group rather than of the mother's. Still others routinely use group O, Rh-negative donors for all cases, with or without crossmatching. If group O donors are used routinely, the blood should be titered in order to eliminate those with high titers ("dangerous universal" donors), who theoretically might be undesirable for babies not belonging to group O. The routine use of group O, Rh-negative donors, while convenient, has the disadvantage that it is apt to deplete the supply of group O, Rh-negative blood.

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STERILIZATION OF CATHETERS

To the Editor:—*About 10% of the patients treated here are given intubation either by the oral or by the naso-oral (endotracheal blind intubation) approach. In sterilization of endotracheal catheters, the following technique has been used for many years and there seems to be no reason for changing this procedure: The catheters that are inserted through the nose are washed with soap and water or hexachlorophene, and then they are kept submerged in mercuric cyanide (1:3,000 solution). When they are used, they are rinsed off with ether and lubricated with a lubricating jelly. The trachea is aspirated through a small catheter which has been sterilized by the same solution. The endotracheal catheters with a built-in cuff are sterilized by the same method. They are removed from the mercuric cyanide solution, washed off or dried with ether, dusted with sterile glove powder, and kept wrapped in a sterile towel until use. At that time, the powder is washed off with ether and the balloon part of the catheter is lubricated with lubricating jelly before being inserted into the trachea. A serious vocal cord injury has not occurred. Postoperative hoarseness is rarely noted, and the incidence of postoperative lung complications has been low while this technique has been used. Is there any reason to switch to one of the newer agents?*

Eldon B. Tucker, M.D., Morgantown, W. Va.

Answer.—One hesitates to recommend changes in procedures when an inquirer states so emphatically that he has experienced no difficulty with "tried and true" methods. Most authorities in the field of antiseptics and disinfectants believe that the commonly used mercurials are poor germicides and, unless used carefully, have no place in modern disinfection. All are extremely slow to kill vegetative bacteria. No reference to the tuberculocidal or viricidal activity of mercuric cyanide has been found, although there is evidence that bichloride of mercury, a more toxic compound, in a concentration of 1:1,000 rapidly inactivates influenza and vaccinia viruses. For the destruction of vegetative bacteria, tubercle bacilli, and influenza and enteroviruses, one authority recommends flushing of rubber tubing, "shellack," and "web" catheters by syringing with Wescodyne (450 ppm available iodine), a 2% solution of Amphyl, or a 2.5% solution of Staphene, followed by immersion in the same solution for 10 minutes and rinsing and flushing thoroughly with sterile water. Other modern proprietary and nonproprietary solutions may also be effective. Thorough mechanical cleansing of the instrument should precede the above treatment. It is a moot question as to whether the excess handling required for powdering with a starch preparation (talc should not be used) and rinsing with ether is necessary with the types of catheters available today. There are a number of proprietary and nonproprietary solutions which serve satisfactorily for sterile storage of sterilized catheters.

ACTION OF TESTOSTERONE

To the Editor:—*In view of the recent development of many variations of testosterone and the conflicting claims of some of the pharmaceutical companies regarding their products, please give information on which of these are considered to be most anabolic and least androgenic when given clinical trials in human beings. Also, what attempts, if any, have been made to inhibit the antianabolic effects of corticosteroids by the use of these androgens? If such can be done, do the corticosteroids still possess anti-inflammatory activity when their antianabolic effects have been suppressed? Which of the anabolic steroids is considered the agent of choice in suppressing corticosteroid antianabolic effects? What are the relative proportions of corticosteroids to androgens which are necessary for such activity? In the presence of corticosteroids and androgens, is there any inhibition of the antiallergic effects of corticosteroids (assuming that antiallergic effects and anti-inflammatory effects are not the same)? The same question may be posed in regard to inhibition of antibody reactions, again assuming that these are not necessarily related to antiallergic and anti-inflammatory effects.*

M.D., Washington.

Answer.—Generally speaking, the greater the anabolic effects of a derivative of testosterone, the greater are its androgenic effects. Most derivatives or variants of testosterone are compared clinically to the propionic acid ester of testosterone. Testosterone propionate, when given parenterally, has greater potency and more sustained action than the naturally occurring endogenous testosterone and about four times the potency of free testosterone in oil when injected. In the average woman, monthly amounts of 300 mg. of testosterone propionate may be given without interfering with normal menses and without masculinizing effects. The dark-complexioned and brunet woman is more likely to experience these latter effects in somewhat lower dosages, due to larger amounts of endogenous androgens. The dosage of any testosterone preparation has to be individualized in each patient, depending on age, sex, state of nutrition, dietary intake, and presence or absence of disease. The antianabolic effects of the corticosteroids in normal or moderate dosages can be prevented by adequate dietary intake. When large doses are used, the antianabolic effects can be prevented by giving 25 to 50 mg. of testosterone propionate intramuscularly daily and, occasionally, at intervals of two to three times weekly. Androgen therapy does not affect the antiallergic, anti-inflammatory, and/or antibody reactions of the corticosteroids.

VITAMIN B_{12} REQUIREMENT IN ANEMIA

To the Editor:—*Does a patient with pernicious anemia, who is being well maintained on the standard dose of vitamin B_{12} given hypodermically, require more vitamin B_{12} if an infectious disease develops? If so, does the severity of the infection determine the amount of increase required? Have tests been made on such patients who have contracted infectious diseases to see whether they undergo certain blood depletions that would call for more vitamin B_{12}?*

H. Ward Randolph, M.D., Richmond, Va.

Answer.—Although it is usually stated that patients with pernicious anemia should receive an increased amount of vitamin B_{12} when a complicating infection develops, this recommendation is based largely on theoretical considerations. Fortuitous observations have occasionally shown that, when an acute infection develops in a patient with pernicious anemia during the initial reticulocyte response to vitamin B_{12}, the erythropoietic progress may be temporarily halted. In monkeys maintained on diets containing barely adequate amounts of folic acid, the creation of turpentine abscesses resulted in a megaloblastic type of bone marrow. This could be prevented by the administration of folic acid but not vitamin B_{12}. However, other than in serum hepatitis, which presumably seriously compromises the storage function of the liver for vitamin B_{12}, it has not been shown that the serum level of vitamin B_{12} is significantly reduced or urinary excretion increased by infections.

Even in normal subjects, and more obviously in patients with hemolytic anemias with no detectable evidence of vitamin B_{12} deficiency, certain types of nonbacterial upper respiratory infection may cause a temporary complete cessation of erythropoiesis with cellular hypoplasia of the bone marrow. Chronic infections are commonly associated with moderate anemia due to erythropoietic hypofunction. Characteristic is a fall of the serum iron level and of the level of iron-binding protein of the plasma. Indeed, the deleterious effects of infection on diverse biochemical functions are well known. Some, such as the increased insulin requirement in diabetes mellitus, are reversible. Thus, in theory and by analogy, it is possible that infection may create a need for more of the precursors of biochemical processes concerned with erythropoiesis, perhaps including a need for more vitamin B_{12} in pernicious anemia. Consequently, despite the lack of direct clinical evidence that more vitamin B_{12} will promote erythropoiesis in pernicious anemia during infections, the prudent physician will be well advised to at least double the maintenance dosage of vitamin B_{12} at no great inconvenience or expense to his patient.

STAPHYLOCOCCUS CARRIERS

To the Editor:—*The chairman of the infection committee in a hospital has been concerned as to what to do with the nasal carriers of coagulase-positive strains of Staphylococcus pyogenes var. aureus among key personnel of the obstetrics and surgical services. Specific antibiotic therapy based on sensitivity studies of the organism involved has been recommended. Bacteriophage typing has not been done, as facilities for this service will only accept material from patients with active cases. Some of the personnel rebel at having to take antibiotics when they feel well. Others cooperate with therapy but never succeed in showing negative results on nasal culture after supposedly adequate courses. Others have a temporary loss of nasal staphylococci but have a relapse after several months. In a small community where paramedical personnel of all types are at a premium, such persons as delivery room supervisors or surgical scrub nurses, who cannot be replaced, should not be removed from duty. How important is the role of the nasal carrier? Please give recommendations as to management of nasal carriers in such a situation.*

Helen A. Horn, M.D., High Point, N. C.

Answer.—The treatment of key personnel who have congulase-positive staphylococci in the nose and throat does not consist of giving antibiotics. In the event such organisms are there after acute infections, it is logical, either with the properly chosen sulfonamide drugs or with antibiotics, to clear up the residual infection, but in chronic carriers the usual experience is that these organisms disappear while the subject is under therapy only to reappear within a relatively short time after treatment has been discontinued. The answer to this problem consists of a return to strict medical aseptic techniques. It is largely due to the loss of this factor that hospitals now face the Staphylococcus problem. The reliance has been on anti-infective drugs rather than on properly applied aseptic techniques. Such key personnel may continue to be employed as long as they are taught the tenets of medical asepsis, washing their hands thoroughly after blowing their nose, touching their face, or going to the toilet, as well as thorough washing and rinsing at least three times before proceeding from one patient to another. Type-specific bacteriophage has been used, both as a nasal spray and by intramuscular injection, to clear up the carrier state, and good results have been reported.

PREOPERATIVE TUBERCULOSIS THERAPY

To the Editor:—*A 41-year-old Negress is scheduled to have a hysterectomy for uterine leiomyoma. She was first given the diagnosis of tuberculosis in 1949. When hospitalized she had fever, positive sputum culture, positive tuberculin skin test, massive pleural effusion, and a small, soft infiltrate in the upper lobe of her left lung. The clinical impression was miliary tuberculosis. This was never established, and she was discharged after six months' therapy with streptomycin as having minimal, inactive tuberculosis. Since that time she has had regular chest x-ray and sputum examinations. The soft infiltrate healed without residuals, and findings on x-rays of the chest were essentially negative. Sputum specimens have been negative. Her diagnosis at present is pulmonary tuberculosis, minimal and inactive (nine years), with exercise status 4. It has been suggested that she be given isoniazid for five days preoperatively to prevent relapse of her tuberculosis. If treatment is indicated, what would be a satisfactory regimen?*

M.D., Georgia.

Answer.—Negro patients with pulmonary tuberculosis are more prone to have exudative types of the disease, especially the caseous pneumonic form. This is associated with a high degree of sensitization from a diet high in carbohydrates and congestion in housing allowing for intimacy and a massive dose infection with tubercle bacilli. Negroes have thus had a tuberculosis mortality of about six times that of the white population. They also have had an average sickness interval before death of about one year, compared to three years for white patients. With the marked decline of tuberculosis mortality across the United States to about 7 per 100,000, the racial decreases in proportion to the population have been about the same. This is most likely associated with the sharp decrease in milk-borne infection and the improved economic status with resultant improvement in housing. This patient should be given isoniazid for about two weeks before and several weeks after operation. The diet should be high in protein and fat, with only the natural carbohydrates in the vegetables. The anesthesia might best be spinal, and if the red blood cell count is low or depleted during operation it should be built up by transfusion.

ORAL TREATMENT OF DIABETES

To the Editor:—*In view of the fact that treatment in the young diabetic is seldom successful with tolbutamide, please give information on what, if any, influence on the unborn child treatment of a 31-year-old primigravida with this drug would have. The patient was recently found to have a low-grade diabetes.* *M.D., Virginia.*

Answer.—Experience with tolbutamide in the management of diabetes complicating pregnancy is limited, primarily because most such patients are of an age group which characteristically exhibits a labile or "juvenile" type of diabetes. In such patients tolbutamide therapy is generally contraindicated. Probably not more than 15% of pregnant patients with overt diabetes exhibit the disease in sufficiently mild and stable form to warrant a careful trial of sulfonylurea therapy. Among those cases of diabetes complicatng pregnancy which have been reported to this consultant in the past three years, all patients were carefully selected for tolbutamide therapy because of the mild and stable character of their diabetes and several pregnancies were carried to a successful termination with delivery of healthy babies. No evidence of untoward effect of tolbutamide therapy on mother or fetus was found. It must be emphasized, however, that the pregnant diabetic is especially prone to the sudden appearance of ketoacidosis in the latter weeks of pregnancy. This complication is a major cause of fetal death. Thus, even the pregnant patient with mild diabetes, if placed on sulfonylurea therapy, must be observed with vigilance in anticipation of the possible development of acidosis and need for pharmacological doses of insulin.

Answer.—Even at the age of 31, a person with diabetes in an early stage may respond well to tolbutamide. Visceral toxic effects are seldom seen, so a favorable opinion would seem to be indicated. This consultant is unaware of any definitive evidence on this point, however, and must therefore advise the use of insulin and/or diet during the pregnancy. All investigators have been faced with the same risks in human subjects. They have been reluctant to make (or at least to report) trials, and no animal experiments have been recorded.

DUTIES OF OPERATING ROOM NURSE

To the Editor:—*An anesthesiologist who recently began private practice in a small city had, all through his training, taken the duties of the circulating nurse in the operating room pretty much for granted, especially in regard to the anesthesiologist. This was challenged recently by the operating room supervisor, and the chief of surgery and the anesthesiologist are now interested in having some references that may have been proposed in the past in answer to the question, "What are the duties of a circulating nurse in an operating room?" For example, during induction, it has always seemed a wise policy to have either the surgeon or his assistant in the room, with the circulating nurse right by the side of the patient, preferably on the side with the intravenous apparatus. The supervisor states that the circulating nurse should have no part in this role. Surely this attitude cannot be in the best interest of the patient. Please give an opinion for presentation at the next surgical staff conference.*

Harold F. Dallas, M.D., Poughkeepsie, N.Y.

Answer.—In a well-known general hospital, the duties of the circulating nurse are not described in a manner limiting her only to the duties associated with the operation. She is available to help the anesthesiologist if he needs her help, but too frequently she is expected to do many of the routine things that the anesthesiologist should do for himself, such as having syringes, ampuls of various medicaments, intratracheal tubes, and laryngoscopes immediately available and his gas machine opened up for use. The circulating nurse should not be expected to do many of these routine things, but she might be expected to lend a hand to the anesthesiologist if it would be of some assistance to him.

WATKINS' TRANSPOSITION OPERATION

To the Editor:—*Until about 1953, a surgeon who had trained in Vienna and Switzerland performed many Watkins' transposition operations in this hospital for the most severe cystoceles. This operation brings the corpus of the uterus down in front of the prolapsing bladder. This surgeon has now retired, and some of the other members of the staff will probably have to perform hysterectomies on some of these women with malignancies. Even those surgeons who have board certification have never seen the technique for hysterectomy under such conditions. Please give information on this complicated hysterectomy.*

Michael E. Connelly, M.D., Sharon, Pa.

Answer.—Uterine malignancy after the Watkins' transposition operation indeed poses a serious problem. Inasmuch as the cervix is usually amputated in this procedure, the probability is that one would be dealing with a carcinoma of the corpus. After the transposition technique has been performed, the uterus is fixed in the anterior vaginal wall in an inverted position and access to the uterine cavity for diagnostic curettage or radium insertion is difficult, if not impossible. Thus, material for microscopic examination would be difficult to obtain. Technically, vaginal hysterectomy after Watkins' operation poses no particular problems except that the operator must bear in mind the postfundal attachment of the bladder. It is not difficult to separate the anterior wall of the vagina from its attachment to the uterus. The anterior dissection usually begins at the fundal portion, and the operator works upward into the vagina. However, this is not the operation of choice for uterine malignancy. When a definite diagnosis of malignancy has been made, the following plan should be used: (1) external radiation to the pelvis; (2) a wait of six or eight weeks; (3) dissection of the anterior vaginal wall from the uterus by the vaginal route; (4) closure of the vaginal incision and continuation by laparotomy; (5) a total hysterectomy and bilateral salpingo-oophorectomy (even though the uterine tubes were detached previously), with the postfundal attachment of the bladder borne in mind; and (6) pelvic adenectomy. This plan would offer the best chance for survival.

MUSTY ODOR OF CLOTHING

To the Editor:—*The family of a 45-year-old man complains that his clothes develop a strong, musty odor, which becomes worse after he has removed the clothes and they have been sitting in a laundry basket. Physical examination of the patient gives normal findings. There are no noticeable skin lesions or body odors. Examination with a Wood's light is also negative. The patient has tried soaps containing hexachlorophene, but these have not made any difference in the odor of his clothing. Please give suggestions on study and treatment of this case.*

James F. Hohl, M.D., Ada, Okla.

Answer.—The question of body odors is an age-old problem and one on which the cosmetic industry has built a highly remunerative sales appeal. To properly answer this question it would be necessary to know (1) how long this has been occurring, (2) what kind of work the patient does and with what materials he comes in contact, (3) what his eating habits are, and (4) whether he has a special fondness for certain types of foods. Odors associated with the human body usually come from fats and may be due to faulty catabolism, that is, from changes in the sebum and apocrine gland excretions. Certain apocrine glands have a specific odor which is characteristic for the particular person and cannot be changed. The exocrine glands secrete such substances as indoles and skatoles from the intestinal tract. These odors would be largely influenced by diet. In some persons butyric acid production is high, resulting in strong odors. Since this odor develops in the laundry basket, one must consider bacterial decomposition due to presence of Clostridium bifermentans or Cl. sporogenes. Treatment is sometimes unsatisfactory if due to an inherited tendency. Otherwise, change of diet, elimination of the aromatic substances, use of such digestants as pepsin, a diastase, dilute hydrochloric acid, papain, and bile salts may be tried. The clothing may be soaked in weak potassium permanganate solution immediately on removal. The intestinal flora may be changed by the use of acidophilic preparations.

RESIDUAL FACIAL PARALYSIS

To the Editor:—*What is the value of physical therapy for a residual facial paralysis of 24 months' duration secondary to neuropathy of the facial nerve?*

Bernard Levine, M.D., Oak Park, Mich.

Answer.—Physical therapy for this condition does not usually result in any clinical improvement. Massage and other passive exercises may be of value in the correction of facial disfigurement in this stage, but this has no influence on the rate of return of motor control. Similarly, the use of electric stimulating currents at this time would have no significant therapeutic effect. It does not influence the rate of nerve regeneration in any way. In the early stages, it is useful in retarding the degree of muscle atrophy but will not prevent it completely, and after two years without return of function atrophy has usually occurred to such an extent that stimulation is without effect.

CONTACT DERMATITIS

To the Editor:—*Certain occupations, such as dentistry, dishwashing, bartending, and poultry plucking, require that people who perform them have their hands in water much of the time. Is there any chemical solution which can be used on the hands to prevent fungus growth or other skin diseases?*

T. R. Pratt, M.D., Pismo Beach, Calif.

Answer.—It is well known that occupations in which the hands are moist or wet repeatedly or for prolonged periods favor the development of dermatitis and, occasionally, also of fungus and bacterial infections. The best way to prevent such secondary complications is to minimize wetting and subsequent excessive dryness of the skin by frequently washing and drying the hands thoroughly and then applying an emollient cream. For that purpose a cold cream of good quality is usually satisfactory. Some state laws require bartenders to use a chemical agent which in itself is a deterrent to infection but which occasionally produces dermatitis. That is the handicap associated with the use of fungicides, bactericides, and the like; therefore, it is best not to recommend them for routine use. A fungus or bacterial infection, when it does develop, is usually more promptly responsive to therapy than a chemical dermatitis from use of protective antifungal or antibacterial agents. An intact normal skin is the best protection against such infection. Minor skin injuries should receive prompt and proper attention, and persons who have dermal abnormalities, such as excessive dryness occasioned by congenital ichthyosis, are more likely to develop dermatitis in such occupations and therefore should be particularly cautious in their activities.

POSTURAL VARIATIONS IN PULSE AND BLOOD PRESSURE

To the Editor:—*In insurance examinations the physician is often asked to determine the pulse and blood pressure with the applicant reclining, sitting, standing, and after three minutes of exercise. What variation should be expected in the normal person? When patients bend far backward or lean far forward for two or three minutes, some have no appreciable change in heart rate while others show a wide variation; this is a constant finding in the same person on repeated examinations on one visit and on subsequent visits. Bending backward in patients with cardiorenal disease or preeclampsia and, to a lesser extent, in those with moderate coronary sclerosis slows the heart. Bending forward gives similar results, but to a lesser degree. Why does bending forward or backward slow the pulse?*

Lloyd H. Murdock, M.D., Zwolle, La.

Answer.—The systolic blood pressure usually falls when a person rises from the reclining position. The change may amount to 10 or 20 mm. Hg in hypertensive persons. The diastolic pressure, on the other hand, is variable and may either rise or fall. The change is usually not great. The result is a drop in the pulse pressure on standing. Exercise usually raises the systolic pressure and may increase or decrease the diastolic pressure, but there is almost always a resulting increase in the pulse pressure. A slowing of the pulse rate associated with bending backward may be due to stretching and consequent stimulation of the carotid sinuses in the neck. This reflex increase in vagal tone is particularly marked in patients with coronary sclerosis. This phenomenon has not been noted consistently on patients leaning forward.

POSTOPERATIVE GENITOURINARY BLEEDING

To the Editor:—*At this hospital a high incidence of postoperative bleeding from the genitourinary tract has occurred recently. The anesthetic used, the patient's position, or the site of operation do not seem to be factors. The condition lasts for only 24 hours, but two cases of renal shutdown have occurred and both were fatal. The urine has been completely bloody, sometimes with and sometimes without cells. Transfusions do not always precede the hemorrhage. The postoperative course varies. Some patients go into shock and others have a normal postoperative course except for the hematuria. Some have indwelling catheters, and others do not. The picture is so varied that it is hard to know where to lay the blame and whether there are several factors at work. Little has been written about this, and any information would be appreciated.*

John J. Rooney, M.D., Nyack, N. Y.

Answer.—On the information given, it is presumed that imperfections in surgical technique have been ruled out. The next procedure is to have the blood being used for transfusion checked and cross-checked for correct typing. If such blood is perfectly compatible, the staff, having found a new and local syndrome, should make a detailed study of it. Such simple things as platelet count, prothrombin time, and presence or absence of serum fibrinolysins should be investigated. If staff members were greatly interested, they could carry out more elaborate studies on coagulation, though use of the three tests mentioned would probably point the way to further studies.

POSTOPERATIVE CEREBROVASCULAR COMPLICATIONS

To the Editor:—*What cerebrovascular complications are likely to occur after mastoid operations? Would carotid artery thrombosis follow such an operation? What complications might result from packing of the jugular bulb?*

M.D., Louisiana.

Answer.—The common cerebrovascular lesions associated with mastoid disease are thrombophlebitis of the sigmoid sinus, the petrosal sinuses, the jugular bulb, and, occasionally, the cavernous sinus. Thrombophlebitis of these sinuses is not as a rule a complication of mastoid operation but is the result of the disease in the middle ear, mastoid, and/or petrous pyramid for which the operation was performed. There is ample evidence that when these complications have progressed or have become evident only after operation it has been because the operation was not adequate to deal with the lesion present. Such lesions have usually been either an already existing but undetected thrombophlebitis or an undrained focus of suppuration in the temporal bone which later involved a venous sinus. Discussions of this question are found in any standard textbook, such as "Otolaryngology" (edited by G. M. Coates and others, Hagerstown, Md., W. F. Prior Company, Inc., vol. 2, chap. 15).

Carotid artery thrombosis in the neck is being increasingly recognized as the underlying mechanism in some cerebrovascular accidents. Most of these cases are spontaneous and are associated with arteriosclerosis, but the condition has been reported after nonpenetrating injuries to the neck. The article by Murphey and Miller (*J. Neurosurg.* 16:1, 1959) may be helpful.

CATARACTS

To the Editor:—*It has been thought that many more young people now than formerly are developing cataracts. If so, is there any etiological explanation for it?*

W. O. Bailey, M.D., Washington, D. C.

Answer.—There are no statistics which indicate that senile cataracts are occurring at a younger age. The cause of cataracts is unknown. There is an impression among many physicians that cataracts are developing at an earlier age. With the development of the intracapsular operation, undoubtedly immature cataracts are being operated on at much earlier stages than heretofore. This is probably the genesis of this impression.

CONGENITAL ANOMALIES

To the Editor:—*A patient belongs to blood group B and her husband to group O; both are Rh positive. She has never had any transfusions. Her first child died a few seconds after birth and had hydrops fetalis, club foot, and other anomalies. In the last month of pregnancy the patient suffered from hydramnios. Is it advisable for her to become pregnant again? What are the chances that she will have a normal child?*

M.D., New York.

Answer.—The results of the blood grouping tests in this case rule out any major blood group incompatibility, so that isoimmunization of pregnancy can probably be excluded as having any bearing on this couple's problem. It is not possible to ascertain the cause of the hydrops fetalis responsible for the baby's death; therefore, no definite statement regarding the probable outcome of future pregnancies can be made. It has been reported that fetuses with certain congenital anomalies may develop hydrops in utero, and this in turn may be complicated by the development of polyhydramnios. The cause of congenital malformations is not known, though there is evidence that hereditary factors play a role, as well as such other factors as nutrition of the expectant mother and the mother's age. Among 500 mothers who gave birth to a malformed child, Murphy found that 275 (55%) experienced subsequent conceptions and that 25 had one and 9 had two additional malformed children (Congenital Malformations, ed. 2, Philadelphia, J. B. Lippincott Company, 1947). These facts should be presented to the couple, and the ultimate decision of whether to undertake additional pregnancies must then rest with them.

INTRAOCULAR PRESSURE AND HYDRATION

To the Editor:—*What is the relationship between intraocular pressure and the underhydration or overhydration of patients? Numerous observers have observed soft eyeballs in diabetic coma and other states of dehydration, but, in states of overhydration, has an increased intraocular pressure been conclusively proved?*

M.D., Washington.

Answer.—A number of stimuli may cause transient changes in the intraocular pressure, and included in these factors is the osmotic pressure of the blood. The normal eye, however, is characterized by homeostatic mechanisms that quickly adjust the intraocular pressure to normal. The administration of a large volume of hypotonic fluid decreases the osmotic pressure of the blood plasma. Presumably the osmotic pressure of the aqueous humor is increased relatively, and dilution of the aqueous humor to the corresponding osmotic pressure results in an increased aqueous volume and an increased intraocular pressure. In the normal eye this increase seldom exceeds 5 mm. Hg within an hour of ingesting 1 liter of water. In a glaucomatous eye the pressure may increase more than 10 mm. Hg. Similarly, substances which increase the osmotic pressure of the blood, such as hypertonic glucose solution, a 5% solution of urea, sorbitol solutions, and the like, tend to decrease the intraocular pressure. There is an extremely large amount of literature on this topic. Much of it is surveyed in the review of glaucoma which appears each year in the December issue of the *A. M. A. Archives of Ophthalmology.*

HAIR LENGTH AND BALDNESS

To the Editor:—*Please give advice as to short hair versus long hair for men. Does the length of the hair have any relation to loss of hair?*

Jerome Kogan, M.D., Stamford, N. Y.

Answer.—Short hair or the cutting of hair has no relationship to receding hair or the prevention of hair loss. This fact has been verified by many separate investigations on numerous occasions.

CONTACT LENSES

To the Editor:—*What is the best type of contact lens? Is a lens with radial grooves around the outer edge advantageous in allowing free circulation of lacrimal fluid beneath the lens?*

P. M. Stoddard, M.D., Fairmont, W. Va.

Answer.—Contact lenses may be worn to improve appearance, as a substitute for spectacles where spectacles are not feasible (as in sports and certain occupations), and to obtain visual improvement not possible with spectacles (as in keratoconus or corneal scarring). There are two general types of contact lenses, each having advantages and disadvantages. Corneal contact lenses are cosmetically the most acceptable and are most easily tolerated, but they are not very satisfactory in contact sports (boxing and wrestling) and hazardous occupations. Scleral contact lenses are less satisfactory cosmetically and not tolerated as well, but they can be worn for any type of use. In most communities, the proper fitting of contact lenses requires the combined skills of the ophthalmologist and a technician trained in this work. The section of ophthalmology of the local medical society can make available the names of such persons. Contact lenses with radial grooves have the advantage of allowing the normal tears to serve as a fluid under the lens and are thought by some to be superior to those not having such grooves.

DERMATITIS AFTER EXPOSURE TO SPUN GLASS

To the Editor:—*A 52-year-old woman used spun glass to decorate a Christmas tree two years ago. She touched her forehead with it and has had an irritation of the forehead ever since. Every two to four weeks she has an eruption on her face. Burning and itching will disappear after a short time and then return. Please suggest treatment.*

E. T. Sager, M.D., Marion, Ohio.

Answer.—Spun glass is a pruritogenic substance capable of causing a dermatitis, but an eruption due to this agent would not recur every two to four weeks without further exposure. Herpes simplex or a dermatitis medicamentosa would be more apt to recur in this way. Therefore, the first step would be to make a morphologic diagnosis. There are no agents that uniformally prevent recurrence of herpes simplex. Smallpox vaccinations (one every two weeks for at least three treatments) will interrupt some cases. A careful history should be taken, and if any drugs, including self-administered analgesics, laxatives, or sedatives, capable of causing a dermatitis have been used at intervals, they should be eliminated. The possibility of a recurrent contact dermatitis should be considered also. Elimination of suspicious contactants from the patient's environment would be recommended. Patch testing may be necessary.

CARCINOMA AND THROMBOPHLEBITIS

To the Editor:—*An article stating that some types of carcinoma give rise to thrombophlebitic phenomena prompted this question: Does endometrial carcinoma give rise to such signs? A 63-year-old woman has had vaginal bleeding associated with carcinoma, but she has also had two or three such episodes in the past that led to the diagnosis of phlebitis of the lesser saphenous vein of the right leg.*

John K. Griffith, M.D., Valley Falls, Kan.

Answer.—Some types of carcinoma, particularly those of the pancreas and occasionally of the lung, give rise to idiopathic recurrent thrombophlebitic phenomena. Malignancies in the female pelvis or tumors compressing the great vein may produce stasis and cause thromboses in a pelvic vein. The fact that the patient had involvement of the same vein, the right lesser saphenous, would suggest a local process rather than a humeral mechanism, which usually produces a migratory phlebitis. A physiologist, an expert on coagulation, stated that endometrial carcinoma could theoretically increase the tendency to intravital clotting, but none of the consulted gynecologists, obstetricians, or internists have seen a patient with migratory thrombophlebitis associated with endometrial carcinoma.

SHORTENED FEMUR

To the Editor:—*During a routine examination, a 32-year-old woman said that she had had a fractured femur in 1948, with shortening of the involved limb by 1 in. She has no complaints referable to her back, but physical examination showed the expected pelvic tilt. She does not wear corrective shoes. In the course of her life is she likely to develop any disability from a pelvic tilt? Is it necessary to compensate for the limb shortening with an elevated shoe, and, if so, what would be the minimal lift required?*

J. E. Rockwell Jr., M.D., Grangeville, Idaho.

Answer.—Some heel raise would be advisable to prevent backache in the future. It is frequently not necessary to make up the entire difference, but in this case an increase of three-quarters of an inch should be provided, since a patient can compensate very well for one-quarter of an inch. This heel raise is best accomplished in stages. The heel of the short leg should be raised one-fourth of an inch and that of the higher lowered one-fourth of an inch. After about three months the heel of the short leg should be raised another quarter of an inch. This method usually is better than taking all of the correction on the affected heel.

WASHINGTON NEWS

U. S. S. R. Sacrifices Quality for Quantity in Medicine . .
Lawmaker Minimizes Radiation Threat . .
VA Medical Program Funds Hiked . .
Civil Defense Funds Cut . .
International Health Research Urged . .

U. S. PHYSICIANS REPORT ON RUSSIAN MEDICAL PROGRAM

A team of American doctors who toured the Soviet Union found that the Russian government has deliberately focused on quantity of medical personnel and widespread coverage of services, at the expense of quality.

According to the five U. S. physicians who visited Russia in 1957 under an exchange program the quality of service in the U. S. S. R. falls far short of that in the United States. However, the physicians reported an "almost explosive extension" of disease prevention and medical care programs in the U. S. S. R. They noted that there is a high ratio of physicians to population and that many hospitals have been built to serve rural as well as urban areas.

Not only were the Russian physicians not as well trained as their U. S. counterparts but the medical facilities and equipment were "antiquated or jerry-built" in comparison to those in the U. S., the report said.

The report, published by the U. S. Public Health Service, said that pestilential diseases and the diseases of filth have been brought under control throughout the Soviet Union, that malaria is almost eradicated and venereal disease controlled, but that tuberculosis remains a major health problem.

The mission was composed of Dr. Thomas Parran, former U. S. surgeon general and now President of the Avalon Foundation; Dr. Otis L. Anderson, assistant U. S. surgeon general; Dr. Henry van Zile Hyde, assistant to the surgeon general for public health; Dr. Malcolm Merrill, California state director of public health; and Dr. Leonid S. Snegireff, associate professor of cancer control, Harvard School of Public Health.

One of the most interesting findings of the group was that three-fourths of Russian physicians are women. The total number of Russian doctors in 1957 was 325,000, compared to about 225,000 in the U. S.

Russian medical students receive only six years of training, in contrast to the nine years in this country, and the medical schools are overcrowded, the report said. As an example, the Americans noted that only six dissecting tables were available at one school for a class of 400 students.

Medical care is free to everyone in Russia, but "there is essentially no freedom of choice of physicians by patient," and the physicians have little or no say about where they practice, the report asserted.

Russia claims 10 or 11 hospital beds per 1,000 population, the U. S. physicians said, while the ratio in the United States is 9.2 beds. However, the report cautioned that the Russian statistics lack confirmation.

Other findings of the group:

Physicians in the U. S. S. R. have less status than engineers.

Clerical help and office equipment of the type found in this country are regarded as "unheard-of luxuries" in Russia.

Political philosophy and political economy are required courses throughout the six-year medical school training.

The range of drugs used in medical practice in Russia "is much more limited in quantity and quality. . . ."

"The health program of the Soviet Union is, like all programs, subject to the needs of the state, and is therefore circumscribed by a series of allocations and goals."

RADIATION HEARINGS END ON OPTIMISTIC NOTE

A House-Senate subcommittee on atomic energy wound up an extensive investigation of radioactive fall-out dangers, and subcommittee chairman Holifield (D., Calif.) concluded that the danger "is not serious."

He made the statement after hearing scores of expert witnesses present their views on whether nuclear tests are depositing harmful amounts of radioactive matter into the atmosphere.

"It is clear now that the possible hazard is very small in comparison to the needs of our defense," said the lawmaker, who in the past has criticized the Atomic Energy Commission for allegedly withholding fall-out information from the public. "I believe testing could be resumed, if necessary, at a limited rate," he said.

The general advisory committee of the AEC told the subcommittee that the average world-wide radiation resulting from all nuclear bomb tests so far is less than 5% of the normal radiation in the air.

The advisory group, composed of nine civilian scientists and engineers, also declared that the radiation from tests was "less than 5% of the estimated average radiation exposure of the American public to x-rays for medical purposes."

Speaking of the internal effects of radioactive strontium (Sr^{90}), the group stated that the amount which has been found in food and water "is less of a hazard than the amount of radium normally present in the public drinking water supply in certain places in the United States, and in public use for many decades."

Warren C. Johnson, vice-president of the University of Chicago, is chairman of the advisory committee.

Representative Holifield said after the hearings ended that radiation from fall-out amounts to some 10% of the natural background radiation and that he believes the task of separating the effect of the 10% from the 100% is too difficult a problem ever to be solved.

Meanwhile another congressional committee took up the subject. A Senate labor and public welfare subcommittee headed by Sen. Lister Hill (D., Ala.) is considering a measure introduced by Mr. Hill that would transfer prime responsibility for radiation safety work from the AEC to the Public Health Service. The administration had no immediate stand on the issue. Arthur S. Flemming, secretary of Health, Education, and Welfare, noted that his agency, the AEC, and the Budget Bureau are preparing a recommendation which will be submitted to President Eisenhower, who will make the final decision. Mr. Flemming said there is no jurisdictional or bureaucratic dispute involved.

VETERANS ADMINISTRATION FUNDS BOOSTED

House lawmakers overrode a House Appropriations Committee budget slash and voted the Veterans Administration enough money to carry out slight fee increases for certain outpatient care by private physicians.

The committee had chopped the outpatient care budget request by $866,000 to a total of 83 million dollars, a cut that would have imperiled the proposed increase in private fees. However, the House restored the amount cut.

In sending the money measure to the Senate the House also approved more money than allowed by the committee for VA inpatient care and for general operating expenses. A total of $792,100,000 was granted for inpatient care at VA hospitals, $14,600,000 more than the committee allotted and 5 million dollars more than the administration sought. General operating expenses were raised $3,400,000 over the committee figure, to $163,400,000.

All told, the agency received $9,500,000 more than the administration sought for the fiscal year starting July 1. The total was $5,039,000,000.

In okaying $30,159,000 for VA hospital construction, an increase of 10 million dollars over the budget estimate, the Appropriations Committee said that for several years it has "urged the Veterans Administration to accelerate its modernization and replacement program, and the increase in the bill will enable VA to move significantly ahead."

The bill provided $15,300,000 for VA medical research, compared with the 11 million dollars proposed by the administration.

HOUSE SLASHES CIVIL DEFENSE MONEY REQUEST

The administration's budget recommendation for the Office of Civil and Defense Mobilization was severely cut by the House, which voted heavy reductions in funds for federal stockpiling of emergency supplies and for allocations to the states. The 25 million dollars recommended for federal financial assistance to the states was pared to 10 million dollars; the $13,900,000 for stockpiling was cut in half. Of the over-all $70,100,000 asked by the administration for the agency, the House approved only $43,700,000.

In another economy move the House trimmed the request of the National Science Foundation from the $160,300,000 asked to a total of $143,200,000.

INTERNATIONAL HEALTH PROGRAMS BACKED

Lawmakers, physicians, health leaders, and businessmen agreed on the need for expanded efforts to tackle international health problems at the second National Conference on World Health held in Washington, D. C., recently. Much of the discussion at the conference, sponsored by the National Citizens Committee for the World Health Organization, centered on the measure approved by the Senate Labor and Public Welfare Committee that would create a new National Institute of International Medical Research. Sen. Lister Hill (D., Ala.) chairman of the committee, predicted Congress would approve the bill and that 50 million dollars would be appropriated for the program's operations next fiscal year. All of the speakers at the three-day conference agreed that the federal project should not hamper private efforts.

During one of the panel discussions it was disclosed by Dr. James A. Shannon, director of the National Institutes of Health, that the measure may be modified to authorize use of funds abroad for public health research programs as well as for medical research.

MISCELLANY

U. S. Surgeon General Leroy Burney warned that a recent outbreak of smallpox in Germany points up the need for all Americans to be vaccinated against the disease. Persons traveling abroad should get up-to-date shots, he said. The official disclosed that as a result of the epidemic in Germany that cost two lives, 15,000 Germans entering the United States were screened by the U. S. Quarantine Service. The German outbreak was introduced in that country by a physician who had contracted the disease in India.

The Food and Drug Administration is investigating reheated fats, such as some of those used in making potato chips, to determine whether breakdown products might be toxic. The inquiry was prompted when a fat by-product used in feeds caused chicken disease some months ago.

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MEETINGS

AMERICAN MEDICAL ASSOCIATION: Dr. F. J. L. Blasingame, 535 North Dearborn St., Chicago 10, Executive Vice President.
1959 Annual Meeting, Atlantic City, June 8-12.
1959 Clinical Meeting, Dallas, Texas, Dec. 1-4.
1960 Annual Meeting, Miami Beach, Fla., June 13-17.
1960 Clinical Meeting, Washington, D. C., Nov. 29-Dec. 2.
1961 Annual Meeting, New York City, June 26-30.
1961 Clinical Meeting, Denver, Nov. 28-Dec. 1.

AMERICAN

1959

May

American Association for the History of Medicine, Wade Park Manor, Cleveland, May 21-23. Dr. John B. Blake, Smithsonian Institution, Washington 25, D. C., Secretary.

American Association on Mental Deficiency, Hotel Schroeder, Milwaukee, May 19-23. Dr. Neil A. Dayton, Mansfield State Training School & Hospital, Mansfield Depot, Conn., Secretary-Treasurer.

American College of Cardiology, Benjamin Franklin Hotel, Philadelphia, May 26-29. Dr. Philip Reichert, 480 Park Ave., New York 22, Secretary.

American Gynecological Society, The Homestead, Hot Springs, Va., May 21-23. Dr. Andrew A. Marchetti, 3800 Reservoir Rd., N. W., Washington 7, D. C., Secretary.

American Ophthalmological Society, The Homestead, Hot Springs, Va., May 28-30. Dr. Maynard C. Wheeler, 30 West 59th St., New York 19, Secretary.

American Trudeau Society, Palmer House, Chicago, May 25-27. Dr. E. P. K. Fenger, 1790 Broadway, New York 19, Secretary.

International College of Surgeons, New York State Section, Concord Hotel, Kiamesha Lake, May 28-31. Dr. Milton S. Weinberg, 3741 75th St., Jackson Heights, N. Y., Chairman, Arrangements Committee.

Minnesota State Medical Association, Hotel Duluth, Duluth, May 25-27. Mr. R. R. Rosell, 496 Lowry Medical Arts Bldg., St. Paul 2, Minn., Executive Secretary.

National Tuberculosis Association, Palmer House, Chicago, May 24-29. Mrs. Wallace B. White, 1790 Broadway, New York 19, Secretary.

Nevada Academy of General Practice, Hotel Riverside, Reno, May 21-23. For information write Dr. Roy M. Peters, 495 S. Arlington Ave., Reno, Nev.

June

American Academy of Tuberculosis Physicians, Atlantic City, N. J., June 6. Dr. Oscar S. Levin, P. O. Box 7011, Denver 6, Secretary.

American College of Angiology, World Conference on Angiology, Marlborough Blenheim Hotel, Atlantic City, N. J., June 5-7. Dr. Alfred Halpern, 11 Hampton Court, Great Neck, N. Y., Executive Secretary.

American College of Chest Physicians, Atlantic City, N. J., June 3-7. Mr. Murray Kornfeld, 112 E. Chestnut St., Chicago 11, Executive Director.

American Dermatological Association, Claridge Hotel, Atlantic City, N. J., June 1-4. Dr. Wiley M. Sams, 25 Southeast 2d Ave., Miami, Fla., Secretary.

American Diabetes Association, Chalfonte-Haddon Hall, Atlantic City, N. J., June 6-7. Dr. E. Paul Sheridan, 1 East 45th St., New York 17, Secretary.

American Electroencephalographic Society, Claridge Hotel, Atlantic City, N. J., June 11-14. Dr. Jerome K. Merlis, University Hospital, Baltimore 1, Secretary.

American Gastroenterological Association, Claridge Hotel, Atlantic City, N. J., June 5-6. Dr. Franz J. Ingelfinger, 69 E. Newton St., Boston 18, Secretary.

American Gastroscopic Society, Atlantic City, June 7. Dr. Arthur M. Olsen, 200 First St., S. W., Rochester, Minn., Secretary-Treasurer.

American Geriatrics Society, Hotel Traymore, Atlantic City, N. J., June 4-5. Dr. Richard J. Kraemer, 2907 Post Rd., Warwick, R. I., Secretary.

American Medical Association, Traymore Hotel, Atlantic City, N. J., June 8-12. Dr. F. J. L. Blasingame, 535 N. Dearborn St., Chicago 10, Executive Vice-President.

American Medical Women's Association, Sheraton Ritz Carlton Hotel, Atlantic City, N. J., June 4-7. Miss Lillian T. Majally, 1790 Broadway, New York 19, Executive Secretary.

American Neurological Association, Claridge Hotel, Atlantic City, N. J., June 15-17. Dr. Charles Rupp, 133 S. 36th St., Philadelphia 4, Secretary.

American Orthopedic Association, Lake Placid Club, Lake Placid, N. Y., June 16-18. Dr. Lee Ramsey Straub, 535 E. 70th St., New York 21, Secretary.

American Physical Therapy Association, Hotel Leamington, Minneapolis, June 21-26. Miss Annetta Cornell Wood, 1790 Broadway, New York 19, Executive Director.

American Proctologic Society, Shelburne Hotel, Atlantic City, N. J., June 15-18. Dr. Norman D. Nigro, 10 Peterboro St., Detroit 1, Secretary.

American Rheumatism Association, Mayflower Hotel, Washington, D. C., June 2-6. Dr. Edward F. Hartung, 580 Park Ave., New York 21, Secretary.

American Therapeutic Society, Shelburne Hotel, Atlantic City, N. J., June 4-7. Dr. Oscar B. Hunter Jr., 915-19th St., N. W., Washington 6, D. C., Secretary.

Association for Research in Ophthalmology, Inc., Atlantic City, N. J., June 8-12. Dr. Lorand V. Johnson, 10515 Carnegie Ave., Cleveland 6, tary-Treasurer.

Catholic Hospital Association of the United States and C St. Louis, June 1-4. Mr. M. R. Kneifl, 1438 S. Grand Blvd., St. Executive Secretary.

Gastroenterology Research Group, Claridge Hotel, Atlantic City, N. J., June 4. For information write Dr. Charles F. Code, Mayo Clinic, Rochester, Minn.

Idaho State Medical Association, Sun Valley, June 14-17. Mr. Armand L. Bird, 364 Sonna Bldg., Boise, Executive Secretary.

Intermountain Pediatric Society, Sun Valley, Idaho, June 26-28. Dr. J. R. Newton, Memorial Medical Center, 2000 S. 9th E., Salt Lake City, Utah, Publicity Chairman.

International Cardiovascular Society, North American Chapter, Hotel Shelburne, Atlantic City, N. J., June 6. Dr. Paul T. DeCamp, 3503 Prytania St., New Orleans, Secretary.

Maine Medical Association, The Samoset, Rockland, June 21-23. Dr. Daniel F. Hanley, P. O. Box 240, Brunswick, Executive Director.

Medical Library Association, King Edward-Sheraton Hotel, Toronto, Can., June 15-19. Miss Nettie A. Mehne, The Upjohn Co., Kalamazoo, Mich., Secretary.

Society for Investigative Dermatology, Ritz Carlton Sheraton Hotel, Atlantic City, N. J., June 6-7. Dr. Herman Beerman, 255 S. 17th St., Philadelphia 3, Secretary.

Society of Biological Psychiatry, Claridge Hotel, Atlantic City, N. J., June 13-14. Dr. George N. Thompson, 2010 Wilshire Blvd., Los Angeles 57, Secretary.

Society of Nuclear Medicine, Palmer House, Chicago, June 18-20. Dr. Morris T. Friedell, 104 S. Michigan Ave., Chicago 3, Chairman, Press & Public Relations Committee.

South Dakota State Medical Association, Sheraton Johnson Hotel, Rapid City, June 20-23. Mr. John C. Foster, 300, 1st National Bank Bldg., Sioux Falls, Executive Secretary.

The Endocrine Society, Chalfonte-Haddon Hall, Atlantic City, N. J., June 4-6. Dr. Henry T. Turner, 1200 N. Walker St., Oklahoma City 3, Secretary.

Upper Peninsula Michigan Medical Society, Gateway, Land of Lakes, Wis., June 19-20. Dr. Richard D. Cecconi, Iron Mountain, Mich., Secretary.

Wyoming State Medical Association, Jackson Lake Lodge, Moran, June 11-14. Mr. Arthur R. Abbey, Box 2036, Cheyenne, Executive Secretary.

July

American Society of Facial Plastic Surgery, New York City, July 17. Dr. Samuel M. Bloom, 123 E. 83rd St., New York 28, Secretary.

American Society of X-ray Technicians, Shirley Savoy Hotel, Denver, July 4-9. Miss Genevieve J. Eilert, 16 14th St., Fond du Lac, Wis., Executive Secretary.

Oregon Cancer Conference, University of Oregon Medical School, Portland, July 16-17. Dr. Martin A. Howard, 1115 S. W. Taylor St., Portland 5, Ore., Chairman.

Rocky Mountain Cancer Conference, Brown Palace Hotel, Denver, July 22-23. Dr. N. Paul Isbell, 835 Republic Bldg., Denver 2, Chairman.

August

American Congress of Physical Medicine and Rehabilitation, Hotel Leamington, Minneapolis, Aug. 30-Sept. 4. Miss Dorothea C. Augustin, 30 N. Michigan Ave., Chicago 2, Executive Secretary.

American Dietetic Association, Statler Hilton, Los Angeles, Aug. 25-28. Miss Ruth M. Yakel, 620 N. Michigan Ave., Chicago 11, Executive Secretary.

American Hospital Association, Statler Hotel, New York City, Aug. 24-27. Dr. Edwin L. Crosby, 18 E. Division St., Chicago; Director and Secretary.

American Veterinary Medical Association, Hotel Muehlebach, Kansas City, Mo., Aug. 24-28. H. E. Kingman Jr., D.V.M., 600 S. Michigan Ave., Chicago 5, Executive Secretary.

Biological Photographic Association, Inc., Sheraton-Mount Royal Hotel, Montreal, Canada, Aug. 31-Sept. 3. Miss Jane H. Waters, Box 1668, Grand Central P. O., New York 17, Executive Secretary.

National Medical Association, Detroit, Aug. 10-13. Dr. John T. Givens, 1108 Church St., Norfolk, Va., Secretary.

Nevada State Medical Association, Reno, Aug. 19-22. Dr. Gilbert C. Lenz, 505 S. Arlington Ave., Reno, Nev., Chairman.

Rocky Mountain Radiological Society, Shirley-Savoy Hotel, Denver, Aug. 20-22. Dr. John H. Freed, 4200 E. Ninth Ave., Denver 20, Secretary-Treasurer.

West Virginia State Medical Association, The Greenbrier, White Sulphur Springs, Aug. 20-22. Mr. Charles Lively, P. O. Box 1031, Charleston 24, Executive Secretary.

September

American Association of Medical Clinics, Sheraton-Blackstone Hotel, Chicago, Sept. 24-26. Dr. Edwin P. Jordan, Box 58, Charlottesville, Va., Executive Secretary.

American Association of Obstetricians and Gynecologists, The Homestead, Hot Springs, Va., Sept. 10-12. Dr. E. Stewart Taylor, 4200 E. Ninth Ave., Denver 20, Secretary.

American Association for the Surgery of Trauma, Mount Washington Hotel, Bretton Woods, N. H., Sept. 24-26. Dr. William T. Fitts, Jr., 3400 Spruce St., Philadelphia 4, Secretary.

American College of Gastroenterology, Biltmore Hotel, Los Angeles, Sept. 19-26. Mr. Daniel Weiss, 33 W. 60th St., New York 23, N. Y., Executive Director.

American College of Surgeons, The Traymore Hotel, Atlantic City, N. J., Sept. 28-Oct. 2. Dr. Paul R. Hawley, 40 E. Erie St., Chicago 11, Director.

American College of Surgeons, Ohio Chapter, Statler Hotel, Cleveland, Sept. 11-12. Dr. Berton M. Bogle, 311 S. Market, Troy, Ohio, Secretary-Treasurer.

(Continued on page 32)

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THE PROBLEM OF MALIGNANCY IN NODULAR GOITER—RECAPITULATION AND A CHALLENGE

Joseph E. Sokal, M.D., Buffalo

The relation of thyroid cancer to nontoxic nodular goiter and to initially benign thyroid adenomas has been the subject of prolonged and vehement controversy. Some authors have claimed that very many nontoxic nodular goiters are malignant and have recommended immediate thyroidectomy in all cases. It is here pointed out that nontoxic nodular goiter is a fairly common finding (at least 30,000 palpable goiters per million of population) while thyroid cancer is rare (only 25 cases diagnosed per million of population per year). There is evidence that surgical removal of all nodular goiters would result in more loss of life than could be justified by the resultant decrease in mortality from thyroid cancer. Emphasis today should be on the differential diagnosis of the thyroid nodule, with prompt operation in cases where the probability of malignancy is high and conservative treatment otherwise.

THE ASSOCIATION between nodular goiter and thyroid cancer was first commented on many years ago. Thyroid cancer was known to be more common in regions where goiter was prevalent than in "nongoitrous" areas. Leading authorities taught that the majority of thyroid cancers arose in previously benign adenomas. However, there was not much concern over the risk of cancer in the individual patient with nodular goiter. In 1929, for example, Coller[1] wrote:

> The ratio of carcinoma to goiters removed varies with the clinic from 1.2 to 4.6 per cent, but this gives an exaggerated idea of the adenoma as a precancerous lesion. As Balfour pointed out, patients with cancer of the thyroid eventually seek surgical aid, while the majority of persons with adenomatous goiters are not operated on. The true incidence of carcinoma in adenoma cannot be stated, but it would be very much less than any figures we have at present. The adenoma is a precancerous lesion but the true incidence is so small that it should not be a great cause for anxiety to the person with adenomatous goiter.

In 1945, however, this view was strongly challenged by Cole, Slaughter, and Rossiter,[2] who stated that a high percentage of nontoxic nodular goiters are malignant. Since then literally hundreds of papers have been written on this subject, and discussion of the problem has often been marked by violent controversy. Some authors have claimed that very many nontoxic nodular goiters are malignant and have recommended immediate thyroidectomy in all cases. Others feel that the incidence of malignancy in nodular goiter is quite low, that only a few selected cases should be

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From the Division of Medicine, Roswell Park Memorial Institute.

operated on, and that even in these cases moderate delay in treatment has relatively little effect on the final outcome. In spite of the extensive literature on this subject, no agreement appears to have been reached regarding the basic statistics or the preferred management of patients with nodular goiter. It is the purpose of this paper to review this problem, summarize the opposing viewpoints, call attention to additional statistical evidence which is now available, and indicate the kinds of information needed to resolve the present controversy.

Arguments for Routine Removal of Nodular Goiters

By far the majority of publications on this subject support the view that the incidence of malignancy among nontoxic nodular goiters is quite high and that most or all such goiters should be removed as soon as they are detected, because of the risk of cancer. It has been claimed that many lives could be saved by systematic search for, and removal of, nodular goiters. This doctrine, which is taught to most medical students and surgical residents today, is based on the following considerations:

Statistics from many surgical centers throughout the United States indicate that from 4 to 17% of all nontoxic nodular goiters removed are malignant.

The reports dealing with this subject are too numerous to discuss individually. Some authors reporting very high percentages of malignancy have included patients known preoperatively to have thyroid cancer under the heading of "nontoxic nodular goiter." This practice is undesirable and tends to confuse the issue. The question under discussion is, "How many nodular goiters are malignant?" not, "How many thyroid cancers are malignant?" When the two groups are combined in varying proportions, statistical evaluation becomes impossible. Fortunately, many authors guilty of this practice provide sufficient information to make it possible to exclude the known cancers and recalculate the necessary percentages. When this is done, the percentage of malignant goiters is reduced somewhat and agreement with other reports is better. One may conclude that approximately 8% of nontoxic nodular goiters removed at representative surgical centers in the United States are malignant.

It is impossible to differentiate preoperatively between benign and malignant goiters.

This statement is made by most authors discussing this problem. In some cases it is supported only by a few case histories of patients thought to have benign goiter who proved to have thyroid cancer. In most reports, however, the preoperative classification of patients is given in evidence. Cases are divided into "cancer suspected" and "cancer unsuspected" groups. As would be expected, malignancy is found more frequently in the former than in the latter. However, even among the nontoxic nodular goiters removed without the preoperative recording of a suspicion of cancer, histological examination demonstrates malignancy in a significant number. There is rather good agreement among most authors that the frequency of malignancy in this "cancer unsuspected" operative group ranges from 3 to 7%. This category includes by far the majority of patients and the majority of thyroid cancers, in most recent series. It is concluded, therefore, that preoperative differentiation between benign and malignant goiters is impossible in most cases. Furthermore, many of the criteria on which the clinical impression of thyroid cancer is based, such as fixation, tracheal compression, and vocal cord paralysis, are associated with poor prognosis. It would be unfortunate if surgery were delayed until such signs develop.

Even though a nodular goiter may be benign at the time it is detected, it is likely to become malignant later and should therefore be removed as cancer prophylaxis.

Many authors have emphasized this point. They cite the fact that in many series of thyroid cancers a history of preexistent goiter, often of long duration, was elicited in a large percentage of patients. Some authors cite individual case histories of patients with quiescent, apparently benign nodular goiters which eventually began to grow rapidly and proved to be thyroid cancer. Lahey and Hare[3] stated, "Prophylactic removal of all discrete adenomas would do much to lower, if not abolish, the occurrence of cancer of the thyroid." However, no author recommending prophylactic thyroidectomy has presented evidence to indicate just how frequently benign goiters become malignant. Some, in fact, have minimized this argument and base their recommendation for routine removal of nodular goiters on the thesis that thyroid nodules are likely to be malignant rather than become malignant.

The operative mortality and morbidity in nontoxic nodular goiter is so small as to be insignificant. Therefore, it is worthwhile to operate on 100 patients even if only 3 or 4 prove to have thyroid cancer.

It has been pointed out that more cancers are found at thyroidectomy for nontoxic nodular goiter than at biopsy of clinically benign breast masses.[4] Since the latter is accepted as a routine procedure, the former should be also. Additional advantages of thyroidectomy which are emphasized include the relief of pressure symptoms, the cosmetic benefits, and the relief of anxiety over possible malignancy on the part of both the patient and the doctor.

Arguments Against the Routine Removal of Nodular Goiters

Several authors have voiced strong objections to the thesis that all nontoxic nodular goiters should be removed as soon as they are found. They present the following arguments:

The statistics reported from surgical centers are highly selected and are not representative of the population in general.

The great majority of patients with nodular goiter are never seen by surgeons and thus do not appear in surgical statistics. Patients often refuse surgical referral, in the conviction that a goiter which has been static and asymptomatic for years need not be removed. General practitioners and internists refer asymptomatic patients to surgeons chiefly when they are concerned over the possibility of cancer (whether or not they record such suspicion in the clinical record). Many nodular goiters regress with iodine or thyroid medication, or spontaneously, and thus do not appear in surgical statistics. Thus, only a minority of nontoxic nodular goiters are operated on; these have been carefully selected at nonsurgical levels, with elimination of most of the benign cases. The surgeons see, and operate on, a small group which contains most of the thyroid cancers. The percentage of cancer reported by surgeons is simply a reflection of the efficiency of the preoperative selective process. If less preoperative selection took place, the incidence of malignancy among surgical specimens would be lower than the usual 8%. In one series with relatively little selection, cancer was found in 1.7% of nodular goiters.[5]

Nodular goiter is quite common, while thyroid cancer is very rare. Therefore, only a small percentage of nodular goiters could possibly be malignant.

Estimates of the frequency of nontoxic nodular goiter in various regions of the United States have been made. The population samples examined varied considerably. Results range from 3 to 4%, detected during physical examination of healthy adults in a "nongoitrous" community,[6] to 57%, found on sectioning of thyroid glands at autopsy, in an area having a high incidence of endemic goiter.[7] Even the lowest of these estimates indicates that several million people in this country have nodular goiter. On the other hand, the frequency of thyroid cancer is very low. The annual incidence of thyroid cancer in the United States is about 25 per million population.[8] Recorded deaths from thyroid cancer number about 1,000 per year in the entire United States, according to the National Office of Vital Statistics. It is obvious, therefore, that only a very small percentage of nodular goiters could be malignant.

Benign goiters can be distinguished clinically from possibly malignant ones with considerable accuracy.

This statement is supported by several lines of argument. The fact that malignancy is found in about 8% of surgical specimens, while statistical calculations indicate that considerably fewer than 1% of all nontoxic nodular goiters could possibly be malignant (see above), is prima facie evidence of rather efficient selection for surgery. There are objections to this simple "proof" of selection, however, which will be discussed below. More acceptable is the evidence presented by authors such as Crile and Dempsey[9] and myself[10] that a relatively large number of cancers were found among nontoxic nodular goiters initially selected for surgical treatment, while few or no cancers were found on follow-up of cases where surgery was not initially recommended. Finally, it has been pointed out by several authors that the thyroid gland is very favorably situated for clinical examination and that a skilled examiner can readily decide whether nodules are likely to be malignant or benign, without waiting for such frank signs of advanced cancer as vocal cord paralysis. Hard, irregular masses with indistinct margins, which grow progressively, are certainly suspect. On the other hand, round, smooth, soft or cystic, sharply defined nodules, which do not grow, may be left alone. Important factors in reaching a clinical decision are reexamination of the thyroid on several occasions over a few months and observation of the effect of thyroid medication on the size of the goiter. Most benign nodules become smaller or disappear with such medication.[11] Radioactive iodine–uptake studies may also be of assistance in differentiating between benign and malignant nodules.[12]

Benign goiters very rarely undergo malignant transformation; hence prophylactic thyroidectomy is not indicated. Furthermore, there is no assurance that prophylactic partial thyroidectomy will prevent the development of thyroid cancer.

Some statistics are now available on the follow-up of groups of patients with apparently benign nontoxic nodular goiter.[13] The development of thyroid cancer among such patients is a very rare event. The principal criticism of some reports of this sort is that the follow-up period may be too short.

The efficacy of prophylactic thyroidectomy is challenged by the presentation of case histories in which thyroid cancer was found some years after the removal of benign nodular goiters. Such cases are not particularly unusual; in one series of thyroid cancer, 17% of patients had had previous thyroidectomy for benign goiter.[14]

Moderate delay in surgical treatment does not appreciably change the outcome of thyroid cancer.

Most authorities agree that thyroid cancers may be classified into two broad groups, according to biological behavior. One, accounting for perhaps one-third of the cases and including several histological types, grows rapidly and invades early and is usually not cured even when immediate surgery is performed. The other, accounting for the majority of cases (principally, papillary adenocarcinoma), grows slowly, is relatively noninvasive, metastasizes late, and has a high "cure rate" even when surgery has been long delayed. Hence, a period of three to four months of observation, prior to reaching a final decision regarding surgery, is justifiable. During this period, the criteria for malignancy or nonmalignancy can be reevaluated and the effect of thyroid or iodine medication can be studied.

Some Statistical Considerations

Frequency of Nodular Goiter and Thyroid Cancer.—An upper limit for the frequency of malignancy among nontoxic nodular goiters can be calculated by comparing the number of such goiters to the number of thyroid cancers in the population. Obviously, if in a particular community there are 1,000 people with nodular goiter and 20 with thyroid cancer, the incidence of malignancy among the nodular goiters cannot be greater than 2%. It may be less than this, however. If five of the thyroid cancers did not present as nodular goiters, for example, the incidence of malignancy among nodular goiters would be only 1.5%. Thus, if we can estimate the frequency of nodular goiter and of thyroid cancer in the United States, we can calculate the maximum possible incidence of malignancy in nodular goiter. The actual figure will be lower than this, since it is known that some thyroid cancers do not arise in nodular goiter and do not present as palpable thyroid nodules. Others are obviously cancer when first seen and would not be counted among nodular goiters.

Several years ago, I made some estimates of the prevalence of nodular goiter and of thyroid cancer in the United States and attempted such calculations of the frequency of malignancy among nontoxic nodular goiters. The basic data I used were not as complete and as accurate as the statistics now available, and my results were, in part, based on indirect calculations. In the light of the better information now available, it is possible to calculate the desired figures more accurately.

The prevalence of nodular goiter differs in different parts of the country and varies with sex and age. It is higher among women than men, in the older age groups than in young adulthood, and in the Great Lakes and Pacific Coast regions than in the East or South. Not all thyroid nodules are clinically detectable; autopsy studies regularly show a higher incidence of nodular goiter than do clinical surveys. Since the problem under discussion is a clinical one, the desired figure is that giving the percentage of clinically palpable nodular goiters in our population. In order for this figure to be representative of the entire population, it should be based on surveys of apparently well individuals, rather than on hospitalized groups, where the incidence of all types of abnormalities might be higher.

The best study of the prevalence of nodular goiter in a representative population sample is that reported by Vander, Gaston, and Dawber.[6] These authors examined over 5,000 individuals between the ages of 30 and 60 in a Massachusetts community. This sample constituted over half of the total population of the community in this age group. Thyroid nodules were felt by one or more examiners in 4% of this group. Individuals under 30 years of age were excluded from Vander's study. This age group, with a low incidence of nodular goiter, outweighs the smaller group over 60 years of age, also excluded, where thyroid nodules are more common. Thus the prevalence of palpable nodular goiter in the entire population of the community sampled by Vander is probably about 3%, rather than 4%. Statistics of comparable quality are not available for other regions of the country. However, such data as are available would suggest that the average for the United States as a whole is higher than that for the eastern seaboard. A very conservative estimate of the prevalence of clinically detectable nodular goiter in the United States as a whole would thus be 3 to 4%, or 30,000 to 40,000 per million population.

A highly accurate figure for the incidence of thyroid cancer in the United States has recently been presented by Mustacchi and Cutler.[8] It is based on a careful survey of 10 metropolitan areas in different regions of the country, with a combined population of 14,600,000. On the average, 25 thyroid cancers are diagnosed annually per million population. This is less than 1 case per 1,000 individuals with nodular goiter.

Comparison of the number of thyroid cancers diagnosed per year with the total number of nodular goiters in the community is a somewhat improper, though striking, way to present these statistics. It does, however, indicate the maximal annual risk for the individual with nodular goiter. This is small indeed. A better way of expressing this hazard is in terms of cumulative risk over a period of years, or over a lifetime. The cumulative incidence of thyroid cancer over an average lifetime of 65 years, calculated from Mustacchi's data, is 1,500 per million population. No good data are available for calculating the cumulative lifetime incidence of nodular goiter. This, of course, would be considerably higher than the prevalence in an average population at one time, given above. It cannot be much less than the 10% estimate I have made in the past, or about 100,000 per million population. Thus, among a million representative inhabitants of the United States, 100,000 would have nodular goiter at some time during their lives and 1,500 would develop thyroid cancer. Since not all thyroid cancers develop in preexistent goiter, the total lifetime risk for an individual with nontoxic nodular goiter cannot be much more than 1%.

Accuracy of Preoperative Evaluation of Nodular Goiters.—Whether it is possible to differentiate preoperatively between benign and possibly malignant goiters has been heatedly debated. The statistical proof of preoperative selection of thyroid cancers, referred to above, does not constitute a satisfactory answer to this question. Even if preoperative diagnosis were impossible, such statistical selection would still be observed, since thyroid cancers eventually come to surgery while most benign goiters do not. On the other hand, reports that "unsuspected" cancers were found in 3 to 7% of thyroidectomies do not constitute satisfactory evidence either. After all, there must have been some reason for referring these patients to surgery. On reviewing clinical charts in a leading university hospital, I encountered many cases in which small asymptomatic nodular goiters were removed without any indication that malignancy was suspected.[10] However, no other indication for surgery could be found on careful review of these charts. Other, apparently similar, cases were not referred for surgery. I was forced to the conclusion that physicians are often reluctant to record their suspicions of cancer in hospital charts.

Surgical statistics from representative university hospitals indicate that about 200 to 500 thyroidectomies for nontoxic nodular goiter are performed annually per million population. This represents only a fraction of the new nodular goiters arising in the community. If preoperative selection of possibly malignant goiters is impossible, then the great majority of thyroid cancers should not reach surgery until they are in an advanced stage, with malignancy clinically obvious. Survival rates should be poor. However, the opposite is the case. The majority of thyroid cancers are resectable, and current survival rates for thyroid cancer are better than for most other neoplasms. The majority of surgical failures are accounted for by the more rapidly invasive lesions, which usually come to operation promptly. Thus, preoperative selection of nodular goiter cannot be random from the standpoint of malignancy, whether or not suspicion of cancer is recorded.

Some degree of preoperative differentiation between benign and malignant goiters is therefore not only possible but actually occurring. In order to evaluate how accurately this can be done, individual series must be analyzed and the initial decision regarding surgery evaluated. Patients not operated on must be followed over a sufficiently long period of time to permit a decision as to whether cancer was originally present. In view of the slow progression of some thyroid cancers, a 10-year follow-up would be preferable to a 5-year one. Although follow-up reports on patients with nodular goiter not operated on have been given by several authors, the period of observation in most cases was not long enough to permit definitive conclusions to be drawn. In the small series I reported,[10] where follow-up was more adequate, highly accurate preoperative selection was demonstrated. Until additional studies are reported, however, an unqualified statement about the accuracy of preoperative selection cannot be made.

Uninodular Versus Multinodular Goiters.—Many authorities believe that malignancy is significantly more common among solitary thyroid nodules than in multinodular goiter. Lahey and Hare,[3] the principal proponents of this view, found thyroid cancer in 10% of uninodular but only 0.6% of multinodular goiters. No other author has reported such a striking difference, and some report no difference. On the average, cancer is found perhaps twice as often among uninodular glands as among those with multiple nodules. In some cases, this may be due to destruction of other preexistent benign nodules by a cancer infiltrating the thyroid gland. In any case, the clinical value of this distinction is dubious. Most nodular goiters are thought to be uninodular clinically.[15] However, at surgery or autopsy most prove to be multinodular. The number of thyroidectomies required to remove all apparently uninodular goiters would not be very much less than the number required to remove all nodular goiters, both uninodular and multinodular. Many authorities have therefore abandoned the attempt to differentiate between patients with uninodular and those with multinodular glands.[16]

Follow-up of Patients with Nodular Goiter.—The present controversy over nodular goiter could be conclusively resolved if statistics were available on the fate of a satisfactory unbiased sample of individuals with nodular goiter. Almost all of the statistics so far presented on this subject are based on selected groups of patients who are not representative of the populations of their respective communities. Patients referred for thyroidectomy constitute a biased sample which contains an excess number of malignant goiters. Patients examined and not referred for thyroidectomy also constitute a biased sample, containing an excess of benign goiters. Only by choosing a representative population sample through criteria not involving the thyroid, and then identifying all the individuals in that sample with nontoxic nodular goiter, can a valid study group be obtained. Follow-up of such a group for a sufficiently long period of time would provide direct answers to the questions presently in dispute: the true incidence of malignancy among nontoxic nodular goiters, the frequency with which benign goiters become malignant, and the accuracy of preoperative evaluation of nodular goiters.

The study of Vander, Gaston, and Dawber[6] is the only one so far reported which meets the above criteria. The preliminary report of these authors, presenting a five-year follow-up of 218 apparently healthy individuals with nontoxic nodular goiter, was published in 1954. Dr. John B. Vander[17] of the U. S. Public Health Service has very kindly furnished the following additional information on this group, now followed for 10 years: Twelve members of the group are now dead (coronary occlusion, seven, and cerebral vascular accident, carcinoma of kidney, carcinoma of cecum, carcinoma of liver, and carcinoma of lung, one each). No member of the group has as yet developed evidence of thyroid cancer.

Although 218 individuals do not constitute a very large sample, and 10 years is not a definitive follow-up period, these findings are highly significant. It is very unlikely that any thyroid cancers originally present in this group would not by now have become evident. If 8% of nontoxic nodular goiters are malignant, 17 thyroid cancers should have appeared in this group. The probability that no thyroid cancer would occur in a sample of this size, drawn from a very large hypothetical population with an 8% frequency of thyroid cancer, is 0.0000001. The probability that such a sample would be drawn from a population with a 4% frequency of thyroid cancer is 0.00013. This constitutes very strong evidence that the true frequency of malignancy among nodular goiters is much less than 8%, or than 4%. On the other hand, statistical evaluation supports the hypothesis that the correct figure is less than 1% (89% probability). Thus, the direct evidence on this point confirms the indirect calculations presented above.

Similarly, adequate follow-up information on patients with nodular goiters not operated on can provide direct evidence regarding the frequency with which benign nodular goiters become malignant. Here, selection of a study group is simpler. All that is necessary is to identify a group of individuals with benign goiters at some arbitrary point in time and follow their fate. Cases in which thyroid cancer becomes evident within a relatively short period (e. g., six months for anaplastic carcinoma, two years for papillary adenocarcinoma) should be excluded, since such would probably have been malignant at the start of the study. A 10-to-20-year follow-up of all other cases would provide the desired information with satisfactory accuracy; even a 5-to-10-year follow-up would provide useful data. Such a study could be performed retrospectively, if an unbiased method is available for identifying patients known to have had nontoxic nodular goiter at an appropriate time in the past. The limited direct evidence of this type so far available, as well as my indirect calculations,[10] indicate that malignant transformation of benign nodular goiters is very rare.

Again, the prospective or retrospective follow-up of a suitable group of patients with nontoxic nodular goiter would provide information on the efficiency of preoperative identification of malignant goiters. Some members of such a group of patients will undergo thyroidectomy promptly after their goiters are discovered. Others will be operated on at some later time. A few might die of inoperable thyroid cancer. By comparing the frequency of curable and incurable thyroid cancers among the patients promptly referred to surgery with the frequency of such cancers in the group where surgery was delayed, an evaluation of preoperative selection can be made.

Comment

Incidence of Thyroid Cancer.—The opposing camps are in agreement on only one point, that nontoxic nodular goiter is a fairly common finding. I know of no one who has criticized my estimate of the frequency of nodular goiter as too high; many would say it is too low.[18] There was some disagreement in the past over the incidence of thyroid cancer. More recently, however, review of all types of statistics on thyroid cancer showed them to be in satisfactory agreement. The figures presented by Mustacchi and Cutler[8] are based on an extremely thorough survey of a large sample of the entire population of the United States. An incidence of thyroid cancer of 25 cases per million population per year is as close to the final verdict as epidemiologic techniques can give.

We are all agreed that there are at least 30,000 to 40,000 individuals with nodular goiter per million of population. If 8% of all nodular goiters are malignant, then there must be 3,000 cases of thyroid cancer per million population. However, only 25 are diagnosed per year. Where are the others? They are not being cured, for they do not appear in surgical statistics.[19] Nor are the patients dying, for the cases do not appear among death certificates or on the autopsy table. Clearly, the burden of proof must now rest on those who claim that such large numbers exist at all.

The evidence for a highly efficient preoperative selective process appears unassailable. Where careful preoperative selection is practiced, the incidence of cancer among nodular goiters removed may be as high as 17%.[12] Where less selection occurs, it may be one-tenth of this figure.[5] Surgeons are usually not aware of the extent of preoperative selection, since it is accomplished principally by patients, general practitioners, and internists. In discussions of this problem with general practitioners, I have frequently been told, "I have followed quite a few patients with nodular goiter for years. I have never seen a thyroid cancer in my practice." It is unfortunate that the combined experience of a group of general practitioners has never appeared in the literature of this subject.

A Challenge:—There are, at the very least, 5 million people in the United States with palpable nontoxic nodular goiter. If as many as 8% of these goiters are malignant, there must be over 400,000 thyroid cancers in the United States. Nodular goiter is not a new disease, so it cannot be claimed that these hypothetical cancers have not yet become evident. If so many cases of thyroid cancer exist, it should be possible to find them. Let those who claim that they exist survey a suitable population sample and show us the necessary number of people either dying or being cured of thyroid cancer.

Differentiation of Benign from Malignant Goiters.—The evidence so far available indicates that very few benign nodular goiters become malignant. In several series, totaling about 6,000 patient-years of observation, no thyroid cancers were observed to develop among presumably benign nodular goiters. The study of Vander, Gaston, and Dawber[9] is a particularly important one in this regard, *since it* represents a carefully organized prospective study of a relatively large and representative sample of a healthy population. Future reports from these workers should provide a definitive answer on this point.

Probably the most important, and certainly one of the most hotly debated, points in the controversy over nodular goiters is the question, "Can benign goiters be differentiated preoperatively from possibly malignant ones?" Plausible arguments have been presented by both sides. Here, the proof of the pudding must be in the eating. If a relatively large number of nodular goiters referred for surgical extirpation contain cancer (as they do), and very few goiters not so referred prove to be malignant (as appears to be the case), then preoperative differentiation is being successfully practiced, whether or not cancer suspicion is recorded in patients' charts.

A Challenge:—A prospective study of the efficiency of preoperative selection in nontoxic nodular goiter would take years to complete. Furthermore, a physician who sincerely believes that it is impossible to differentiate between benign and malignant goiters cannot be expected to violate his conscience by deferring surgery on one group of patients with nodular goiter. However, there is another way to answer this question. Every community has large numbers of people who have had nodular goiter for years. By careful searching of physicians' records and hospital files, it should be possible to identify patients who have had nodular goiter described as an incidental finding many years ago and who were not referred for surgery. (In most institutions it will be necessary to review individual charts, since such "incidental" goiters usually will not appear in a record room diagnostic index.) Let those who believe preoperative selection impossible search for patients recorded as having nodular goiter 10 to 20 years ago, trace these patients, and determine the incidence of thyroid cancer (which should now be obvious) among those not subjected to thyroidectomy. Let them compare this with the corresponding figure for the patients treated surgically. There is no need for concern about whether cancer was suspected or not; in the great majority of cases where cancer was seriously suspected, one may assume that operation followed. Let them simply compare, as I did, the frequency of thyroid cancer among cases where operation was not performed with its frequency among the cases referred for surgery. If preoperative selection is truly impossible, the figures will be identical. They should exclude all patients in the operative group who had palliative resections and, if they wish, all patients who died of thyroid cancer within five years of surgery. Then their figures will certainly measure preoperative selection of "early" cancers.

Conclusions

A generation ago, a large percentage of thyroid cancers were being diagnosed at an advanced and incurable stage. Today, the majority are being diagnosed early and patients are being cured. A major share of the credit for this improvement belongs to the physicians who have called our attention to the potential hazards of the thyroid nodule. As a result of their publications, we are all more aware of the fact that apparently innocent nodular goiter may in fact be thyroid cancer. Patients with suspicious goiters are now being operated on early enough to cure most of the patients with malignant ones. Without question, this is a major advance in cancer therapy. However, as with many reforms, the pendulum has swung too far. *The doctrine that all nodular goiters must be extirpated as soon as they are detected is just as fallacious as the attitude that thyroid cancer is an unimportant cause of death and that masses in the thyroid may be ignored.*

The mortality and morbidity of thyroidectomy are low. However, they are not zero. As several authors have pointed out, the removal of all nodular goiters would certainly result in more loss of life than could be justified by the resultant decrease in mortality from thyroid cancer. It is clear that our efforts should be directed toward improvement of *the criteria for selection of patients for* surgery, rather than toward detection and extirpation of all thyroid nodules.

666 Elm St. (3).

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PULMONARY INFARCTION AFTER DENTAL EXTRACTION

REPORT OF TWO CASES WITH RECOVERY

Crawford W. Adams, M.D.
and
James M. Hudgins, M.D., Nashville, Tenn.

Two case-histories involving men aged 40 and 38 years illustrate the occurrence of pulmonary disease after extraction of teeth. In the first case the pulmonary symptoms commenced seven days after the extraction, with a sudden rise of temperature to 40 C on the 10th day marking the development of a pulmonary infarct. In the second case the pulmonary symptoms commenced five days after the extraction, and the subsequent course was marked by two episodes of severe chest pain indicating the development of pulmonary infarcts. Although the connection of the pulmonary symptoms with the dental procedures was not obvious at first, it became clear later that both patients had cervical phlebothrombosis which led to the pulmonary complications. It is concluded that in all cases of unexplained pulmonary infarction the patient's dental history should be considered.

Although dental extractions are probably the commonest cause of cervical trauma, they are rarely associated with cervical phlebothrombosis or pulmonary infarction. The neck veins usually involved with infection or trauma to the jaws are the ranine, facial, and internal jugular veins. Two patients with cervical phlebothrombosis and associated pulmonary infarction after dental extraction were observed, however, and their cases are reported.

Report of Cases

Case 1.—A 40-year-old man was admitted to the Mid-State Baptist Hospital on Oct. 3, 1956, with the complaint of chest pain associated with chills and fever of two weeks' duration. Three weeks prior to admission, because of abscess formation and advanced periodontoclasia, his two right upper molar teeth had been extracted after a local infiltration of lidocaine hydrochloride. Two days after the extractions the patient developed unusual pain in the right side of the neck, associated with slight swelling. Five days later the patient had pain in the right lower part of the chest, associated with an elevation of temperature. He was seen by his family physician and was told he had "pneumonia," which was treated with "antibiotics" for two weeks. The pain in the right side of the chest increased and then occurred in the

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From the Department of Medicine, Vanderbilt University School of Medicine.

side. He had several "shaking" chills associated with a gh productive of clear sputum. On one occasion the tum was "streaked with blood." The day before adssion to the hospital a roentgenogram demonstrated an vation of the left dome of the diaphragm, thickening of e pleura, and a wedge of increased density in the left ver lung field. In the right lower lung field were two ear areas of atelectasis above the diaphragm (fig. 1*B*). roentgenogram made three years previously had revealed normal cardiac silhouette and clear lung fields (fig. 1*A*). The patient was an obese apprehensive male, lying comtably in bed without dyspnea or orthopnea. His blood essure was 130/90 mm. Hg, pulse 80 per minute, respiraons 20 per minute, and temperature 100.4 F (38 C). There as extensive periodontal disease, with ulceration of the terior gum margins and advanced caries of the right teral incisor and the second right lower molar tooth. There as slight swelling and tenderness to deep palpation along e right lateral aspect of the neck. The chest was symetrical and obese. Auscultation disclosed numerous moist spiratory rales over both lower lung fields posteriorly. The heart size was normal to percussion and the sounds were of good quality. The peripheral arterial pulsations were equal, and there was no evidence of tenderness, heat, or swelling by direct measurement of the lower extremities.

Pertinent laboratory data were as follows: white blood cell count, 9,300 per cubic millimeter with 68% polymorphonuclear leukocytes. The Venereal Disease Research Laboratory test for syphilis gave negative results. The corrected erythrocyte sedimentation rate (Wintrobe method) was 34 mm. in one hour. Sputum was negative for pathogens. A diagnostic thoracentesis of the left side of the chest was performed and no acid-fast bacilli or malignant cells were found. Result of tuberculin skin test was negative. The electrocardiogram was within the limits of normal.

The provisional diagnosis was "virus pneumonia." The patient was treated with aqueous penicillin, 600,000 units every 6 hours, and dihydrostreptomycin sulfate, 0.5 Gm. every 12 hours. A left anterior oblique roentgenogram eight days after admission to the hospital showed linear atelectasis in the right lower lung field and atelectasis associated with pneumonitis and pleural effusion at the left lung base (fig. 2*A*). Four days later a roentgenogram of the lower anterior teeth demonstrated generalized alveolar absorption and periapical and periodontal abscesses involving the mandibular central incisor and the left cuspid (fig. 3). Ten days after admission to the hospital the patient's temperature rose suddenly to 104 F (40 C) and a roentgenogram demonstrated another area of infiltration, typical of pulmonary infarction, at the left lung base.

After consultation the diagnosis of pulmonary emboli originating from a deep cervical vein phlebothrombosis was made. The patient was given bishydroxycoumarin, and the prothrombin time was maintained at a therapeutic level between 15 and 30% of normal. His daily temperature remained elevated, between 100 F (37.7 C) and 104 F, for 5 days and returned to normal on the 20th hospital day. Anticoagulant therapy was continued until the 28th hospital day. A roentgenogram of the chest on the 30th hospital day demonstrated essentially clear lung fields (fig. 2*B*). Surgical removal of the infected teeth was uncomplicated. The antibiotic therapy was maintained until the 32nd hospital day, at which time the patient was discharged. For the past two years there has been no further difficulty.

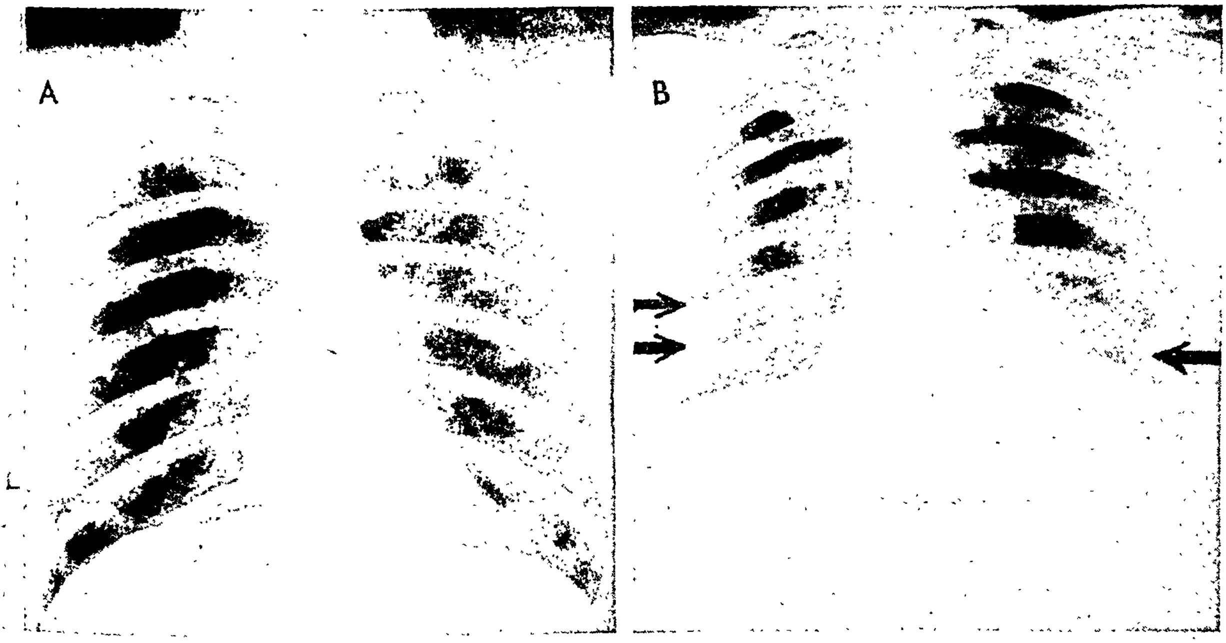

Fig. 1 (case 1).—*A*, normal roentgenograms of heart and lung fields made Sept. 21, 1953. *B*, roentgenogram made Oct. 3, 1956. *Arrows*, pleural thickening and wedge of increased density in left lower lung field and two linear areas of atelectasis above right side of diaphragm.

This case is of unusual interest because of the development of phlebothrombosis of the neck veins and subsequent pulmonary infarction two weeks after the extraction of infected teeth. Because oral infections may be a source of pulmonary embolization, careful examination of the teeth including roentgenograms should be made in all cases of unexplained pulmonary infarction. The development of a sudden pulmonary or pleural "infection" after dental extraction should alert the physician to the possibility of underlying phlebothrombosis of the cervical veins and pulmonary infarction.

Case 2.—A 38-year-old man was first seen by his family physician on June 5, 1958, complaining of "severe left chest pain" intensified by deep inspiration and associated with a nonproductive cough. Five days previously, after a local infiltration of lidocaine hydrochloride, two infected teeth had been extracted.

His temperature was 99 F (37.2 C). There were marked periodontal disease, swelling and tenderness along the anterior lateral aspect of the right side of the neck, and dulness to percussion and moist rales audible over the lower left lung field laterally and posteriorly. The extremities were without tenderness, heat, or swelling by direct measurement.

On the following day the pain in the left side of the chest became more severe, and a roentgenogram revealed small areas of infiltration suggestive of atelectasis in both lower lung fields. The patient was treated with tetracycline phosphate, 250 mg. every six hours, and there was slight improvement. One week later he had another episode of sudden sharp pain in the lower left chest region and again an area of linear atelectasis at the left lung base was demonstrated (fig. 4A). The white blood cell count was 14,800 per cubic millimeter, and the differential blood count unremarkable.

The patient was admitted to Mid-State Baptist Hospital on June 17, 1958, 12 days after the original onset of chest pain. He was given novobiocin sodium, 250 mg. every six hours, and bishydroxycoumarin. Roentgenograms of the teeth

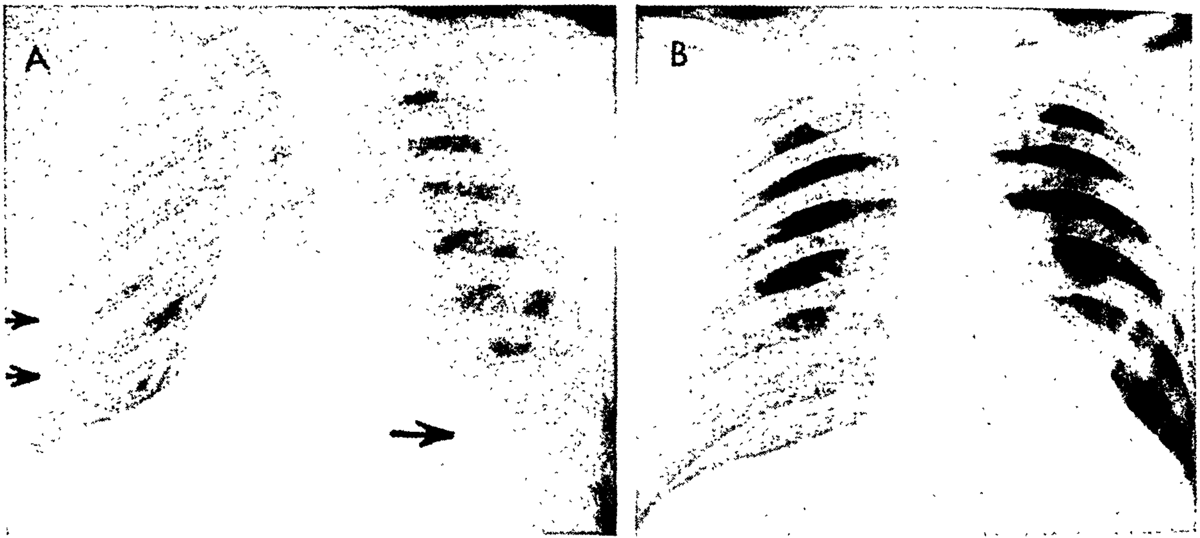

Fig. 2 (case 1).—*A*, eight days after admission to hospital, on Oct. 11, 1956, left anterior oblique roentgenogram demonstrated (*arrows*) linear atelectasis in right lower lung field and atelectasis with pneumonitis and pleural effusion at left lung base. *B*, 30 days after admission to hospital, on Nov. 2, 1956, lung fields were essentially clear.

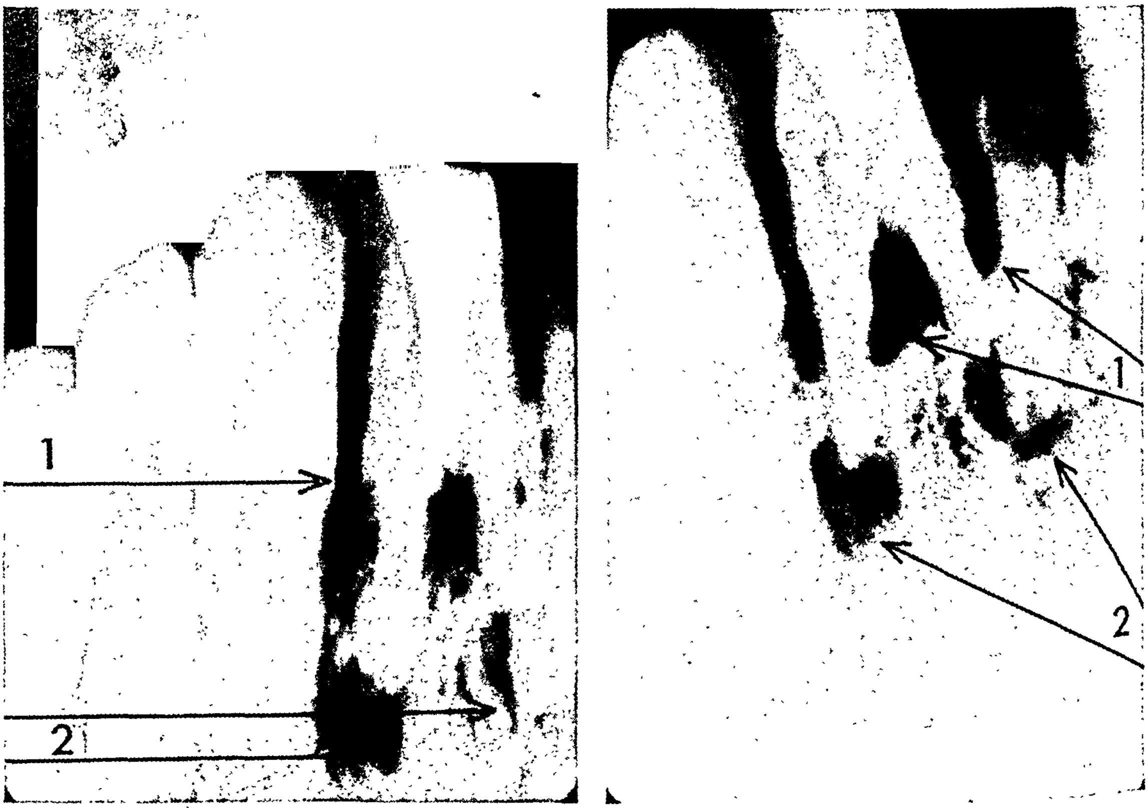

Fig. 3 (case 1).—*Left*, left cuspid. *Right*, central incisor. *1*, periodontal abscesses; *2*, periapical abscesses.

vealed far-advanced periodontal absorption. Bishydroxy-oumarin therapy was continued for 6 days, and on the 10th ospital day the patient had an uncomplicated full-mouth traction of the infected teeth. Novobiocin therapy was scontinued three days after surgery. A roentgenogram 30 ays after the onset of the illness showed no evidence of filtration or atelectasis (fig. 4*B*). The patient was dis-arged after 13 hospital days and for six months has been ithout symptoms.

Review of Literature

Swift,[1] who in 1940 reviewed 49 cases of neck infections collected between 1930 and 1940, was impressed by the unusual array of causal factors; however, neck infection after extraction of infected teeth was common. All but one of the patients with fatal cases of neck infection had teeth extracted before the onset of the neck infection, and local or block anesthesia was used in all of these cases. In Swift's review there were no cases of thrombophlebitis of the internal jugular veins.

In 1942 Iglauer[2] reported the case of a young woman with occurrence of thrombophlebitis of the left internal jugular vein after a sore throat of two weeks' duration who developed bacteremia with metastatic septic emboli to the shoulder, liver, and right lung with abscess formation. The patient recovered after nine surgical procedures and 133 days of hospitalization.

In 1947 Decker[3] pointed out that septic thrombophlebitis of the neck may result from an original focus of infection in the tonsils, ulcerated lesions of the oral cavity, dental abscesses, pharyngomaxillary abscesses, salivary gland abscesses, cellulitis of floor of mouth (Ludwig's angina), retropharyngeal abscesses, abscesses of the neck, or osteomyelitis of the mandible or maxilla.

Nathanson[4] in 1953 reported the case of a 62-year-old man who had an infected tooth removed from the right maxilla three days before the development of pain and swelling on the left side of the face. This left facial phlebitis and cellulitis developed as a result of a retrograde phlebitis of the right facial veins, caused by the septic tooth extraction. It can be seen that retrograde facial vein thrombophlebitis extending into the ophthalmic vein or the cavernous sinus after tooth extraction is not uncommon.[5]

Comment

The superior venous circulation is rarely considered a source of pulmonary infarction. Since there is often a delay of one or two weeks before the symptoms of embolization appear, it is not surprising that this disease of the lung is not associated with the earlier oral trauma. This suggests an important unrecognized cause of pulmonary disease.

The tendency of physicians to dismiss episodes of chest pain, fever, and cough as a "virus pneumonia" may allow this disease to go unrecognized. The ineffectiveness of antibiotics will only serve to confirm the erroneous diagnosis. An accurate diagnosis, based on recognition of the antecedent oral trauma, or a careful search for signs of cervical venous disease may be expected to reveal the correct etiology. This is more than an academic exercise, because proper treatment should include the early use of the anticoagulants.

Careful inspection of the neck region for swelling, tenderness, or other evidence of venous infection or obstruction should be undertaken, in

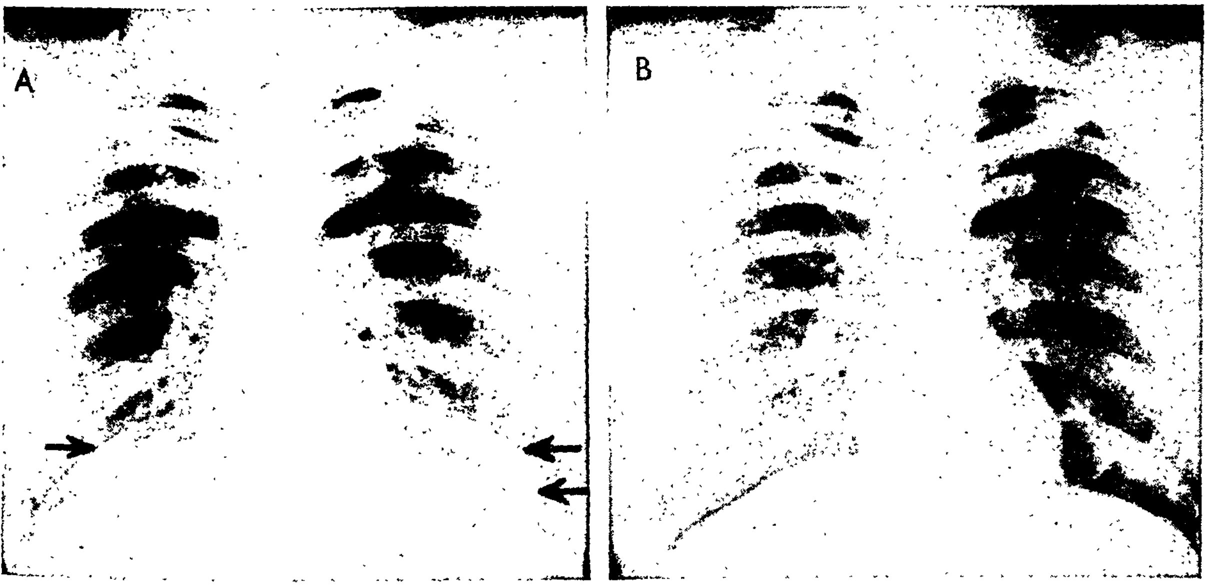

Fig. 4 (case 2).—*A*, chest roentgenogram made on June 19, 1958, demonstrated (*arrows*) linear atelectasis at both lung bases. *B*, on July 5, 1958, 30 days after onset of illness, roentgenogram demonstrated clear lung fields.

addition to routine examination of the lower extremities, with all episodes of unexplained pulmonary infarction.

Summary

Two instances of pulmonary infarction occurred after dental extraction and phlebothrombosis of the cervical veins. Both patients recovered. The superior as well as the inferior venous circulation should be carefully evaluated as a source of unexplained pulmonary infarction, and the distinction between pulmonary embolism arising from phlebothrombosis and "virus pneumonia" after dental extraction should be emphasized because of the importance of early recognition and treatment.

1211 21st Ave., South (Dr. Adams).

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FILTRATION VERSUS LOCAL FORMATION OF LIPIDS IN PATHOGENESIS OF ATHEROSCLEROSIS

Russell L. Holman, M.D., Henry C. McGill Jr., M.D., Jack P. Strong, M.D.
and
Jack C. Geer, M.D., New Orleans

Efforts should be directed toward detection, concentration, and possible clinical utilization of active principles that govern lipid transportation and local accumulation. The best available evidence makes it seem likely that these active principles are enzyme-hormone complexes and indicates that active metabolic work is performed by the mesenchymal cells in the inner layers of the arterial wall. Much confusion can be avoided by keeping interspecies differences in mind and recognizing the probable stage of atherosclerosis in man at any given age. The three stages leading to clinical disease are fatty streaking in the first two decades, conversion of some fatty streaks to fibrous plaques in the second two decades, and local complications such as hemorrhage and thrombosis about a plaque in the third two decades.

The method whereby lipids accumulate in the inner layers of the arterial wall to constitute the first recognizable stage of atherosclerosis is one of the most cogent problems of our time. It is the purpose of this presentation to review the evidence for and against the two current hypotheses, filtration and local formation, and to discuss briefly the possible application of the findings to the pathogenesis of atherosclerosis.

Filtration

The data for filtration are based on logic and have no direct support. The argument can be stated simply. Too much of something in the diet leads to too much of something in the blood, and this in turn leads to too much of something in the arterial wall. This philosophy pervades much of the current literature about the relationship of dietary fats to atherosclerosis and implies that filtration is the mechanism whereby visible lipids make their appearance in the inner layers of the arterial wall.

From the Department of Pathology, Louisiana State University School of Medicine.

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There is some inferential support for this argument in the work of Kellner and Chang [1] and others who found that labeled cholesterol appeared in the subcutaneous lymph of rabbits after intravenous injections or feeding. This tells us that the labeled compound can pass capillary endothelium, but nowhere has visible lipid been demonstrated and it is unwise to assume that endothelium in the turbulent environment of the aorta and large coronary arteries behaves the same as that in the quiet recesses of the capillary bed. One direct attempt to come to grips with the problem has been made by Buck,[2] who studied the inner surface of the endothelial cells of the aorta in rabbits and found that cholesterol feeding resulted in the production of large cisternae in the endoplasmic reticulum of the endothelial cells. This material was not osmiophilic, and it is questionable whether it was truly intracytoplasmic.

There is no doubt that the building stones for the lipids are filtered through the endothelium of the arterial wall and of the vasa vasorum and that elevations of blood pressure probably increase the rate of filtration, but the size, shape, form, and chemical structure of the effective building stones are not known. The bulk of evidence favors lipoprotein moieties, but passive movement of these moieties cannot account for the observation that visible lipid makes its first appearance in the cytoplasm of mesenchymal cells in the inner layers of the arterial wall.

The evidence against filtration is more or less conclusive. The size, shape, distribution, and general appearance of the early lesion cannot be explained on the basis of filtration (fig. 1). On the experimental side two masses of data are, to say the least, difficult to reconcile with concepts of filtration. The first of these has to do with the time interval between cholesterol feeding and the first appearance of lesions. Despite the fact that the blood cholesterol level and the level of the other blood lipids starts to rise within a few days after starting the cholesterol feeding, months must go by before lesions begin to make their appearance—and there is no strict correlation between the height of blood cholesterol level and the extent and degree of lesions. While, in general, it can be stated that some elevation of the blood cholesterol level is prerequisite for lesions, everyone who has worked with experimental animals has encountered some animals that do not get lesions, and the vast majority of humans with atherosclerotic lesions have no known hypercholesteremia or hyperlipemia. The other mass of data is even more damning to the filtration hypothesis. There are several examples of hypercholesteremia and hyperlipemia that have been dissociated from arterial lesions of any kind. Alloxan diabetes,[3] detergents,[4] and Seifter's lipid mobilizing factor [5] are all known to produce marked sustained hyperlipemia and hypercholesteremia with no ensuing arterial lesions of any kind. And the data that attempt to explain the absence of arterial lesions on the basis of cholesterol-phospholipid ratios leave much to be desired.

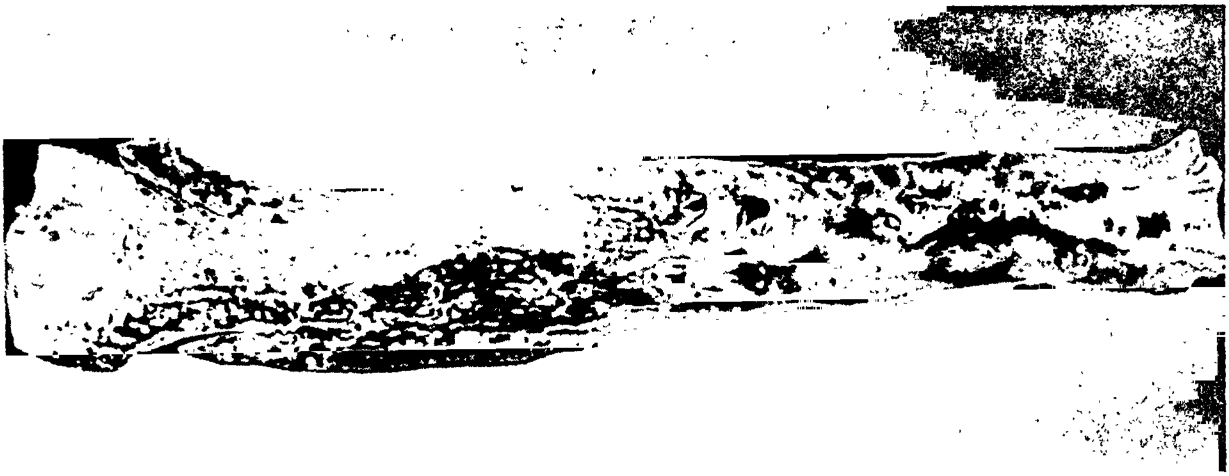

Fig. 1.—Section of aorta stained with Sudan IV. Fatty streaks and patches appear black. Size, shape, distribution, and appearance of lesions do not suggest filtration as method of local accumulation of lipid.

Local Formation

The evidence for local formation is derived from several sources and is increasing in quantity and quality. Siperstein and co-workers,[6] Werthessen and associates,[7] McCandless and Zilversmit,[8] and others have shown that labeled cholesterol and phospholipid can be recovered from the arterial wall within a period of a few hours after adding carbon-14 acetate or phosphorus-32 phosphate to the perfusion fluid in in vitro experiments or to the diet in in vivo experiments. Thus, there can be no question but that the mesenchymal cells in the arterial wall are capable of taking these simple building stones and fabricating lipids from them. Morphologic and histochemical studies on the calf aorta perfused with C^{14}-labeled acetate have confirmed the presence of intracellular and extracellular sudanophilic and osmiophilic lipid after an unexplained lag of about 48 hours.[9]

The gross appearance (size, shape, and distribution) of such lesions as are seen in figure 1 (from a 21-year-old man who died from malignant lymphoma) is admittedly difficult to explain by any mechanism but that of local formation. The curious patchy, speckled, and streaky lesions and sometimes even the serpentine distribution of the lesions, with varying degrees of elevation above the surface and varying amounts of lipid,[10] are no more difficult to explain than are the distribution, size, and shape of the areas and nodules of adenomatous hyperplasia in the thyroid, prostate, adrenal, breast, and ovary. All are compatible with the vagaries of end-organs in response to hormonal imbalance and are less confusing when viewed in the light of local affinities and proximities to source materials, i. e., of end-organs, which may be competing for priorities or may be imbalanced in many ways. Thus, it is possible to consider the mesenchymal cells in the arterial wall as target organs for hormones, and the size of these potential end-organs has been estimated.[11] The findings of Ingenito and associates[12] of a specialized cell in the myocardium and possibly in the intima of the arterial wall, if confirmed, would constitute additional evidence for this hypothesis.

Another unexpected finding has focused our attention on these possibilities. In about 2% of infants (less than 3 years of age), with aortas that were entirely negative for fatty streaks after gross Sudan staining, fine sudanophilic droplets in the cytoplasm of isolated cells or scattered small groups of cells in the inner layers of the arterial wall have been seen on histological and histochemical study of frozen sections of "representative" areas.[13] Many of these cells occupy the position and have the appearance of smooth muscle cells. Thus, we have seen intracellular lipid without extracellular lipid but never the reverse, and this again emphasizes the role of the mesenchymal cells in the earliest stages of atherogenesis and supports the concept of local formation.

To us, the most impressive evidence for local formation is derived from studying hundreds of aortas, coronary arteries, and other arteries collected from various parts of the world; data from accidental deaths were obtained from medicolegal laboratories, and data from deaths due to natural causes were obtained from routine autopsy services in large general hospitals in metropolitan areas (New Orleans; Guatemala City; San Jose, Costa Rica; San Juan, Puerto Rico; Cali, Colombia; Bogota, Colombia; London; Madrid; Barcelona, Spain; and Durban, Union of South Africa). Practically everyone beyond the age of 3 years has shown some degree of fatty streaking of the aorta, and this has been confirmed by gross Sudan staining and microscopic study. The similiarity in the pattern of development of fatty streaks in regard to age in various parts of the world has been striking.[14] Individual differences in each of the areas are marked, but the composite picture for each area is similar to that of other areas—despite the marked variations in genetic background, diet, climate, habits, indigenous diseases, and other factors. It is difficult to believe that each of these persons has consumed too many calories, too much fat, too little protein, too much or too little animal fat, or too much or too little unsaturated fat or that each has had hypertension or some other disturbance that could have left scattered "scars" in the arterial wall that predisposed to differential filtration. It is easier to believe that the arterial wall normally forms and turns over to the metabolic pool lipids not unlike those in the circulating blood and that local imbalances in this normal mechanism result in the local accumulation of lipid that constitutes the first stage of atherosclerosis.

Evidence against local formation is indirect and consists largely of the fact that mesenchymal cells (smooth muscle cells, fibroblasts, and phagocytes) in other parts of the body do not form and accumulate lipids except under special conditions, as exemplified by xanthelasma and xanthoma tuberosum. It must be remembered, however, that the arterial wall is the only pulsatile organ in the body, and this turbulent environment—created by a primary pulse from the lumen and a counter pulse from the vasa vasorum—must afford opportunities for physicochemical activity that are lacking or limited in other parts of the body.

In summary, the logic for filtration and against local formation is far outweighed by the increasing number of direct observations supporting local formation and opposing filtration. The arterial wall is an organ in its own right and should be recognized as such.

Comment

Let us turn now to some of the implications and possible applications of this newer approach to the pathogenesis of atherosclerosis. Two forces are at play: lipid accumulation and reaction to these lipids. This reaction may be (1) superficial, as by incrustation of fibrin (Rokitansky and Duguid), or (2) deep (fibrosis, necrosis, hyalinization, and calcification). The first of these forces is the first stage of atherosclerosis (fatty streaking), and the second constitutes the second stage of atherosclerosis (fibrous plaques).

A third force may come into play, namely, complication of lesions, which constitutes the third stage of atherosclerosis. This may be of local or of systemic origin. Among the local factors that are recognized, these can be listed: hemorrhage due to local vasoconstriction about the margin of one or more fibrous plaques, softening of one or more plaques with ulceration and thrombosis, and embolism (rare). At least two systemic factors are recognized: accretion of additional lipid (related to stage 1) on the surface or about the margins of one or more fibrous plaques and variations in the coagulability of the blood. Whether clinical disease, the fourth stage of atherosclerosis, becomes manifest will depend on the size of the vessel involved, the rate and degree of occlusion of its lumen, and the potential for collateral circulation about the point or points of constriction.

Thus, in order to understand the natural history of this protean disease, it is essential to recognize that different factors may be responsible for the different stages of atherosclerosis. Much confusion has arisen from translation of data among various species of animals and failure to keep proper perspective on the various stages of atherosclerosis. For example, reference is frequently made to the fatty streaks in the aorta and coronary arteries of cholesterol-fed rabbits or chickens with the inference that these data might be pertinent to clinical coronary artery disease in man. Not only does this type of reasoning ignore interspecies caution but it refers the first stage of atherogenesis in one species to the fourth stage of atherosclerosis in another species. Even if the enzyme systems and other mechanisms for lipid transport in the two species were the same—and there is ample evidence that they are not—there still remains the probability that lipid transport has little or no effect on the final episode (complication of one or more strategically located fibrous plaques by hemorrhage or thrombosis) that precipitates the clinical coronary artery disease. We do not wish to belabor this point too much, for there is the possibility (albeit an improbability) that accretion of additional lipid on the surface of a fibrous plaque could be the mechanism of final narrowing to the point of clinical coronary artery disease. Thus, it is conceivable that persistence in the use of these factors which discourage lipid accumulation in the arterial wall could favorably affect the fate of some of the fibrous plaques in the coronary, cerebral, and other arteries. But it is not fair to expect this mechanism to prevent the common complications (hemorrhage and thrombosis) that precipitate clinical disease.

Much of this confusion can be avoided by observing interspecies caution and recognizing the probable stage of the disease in man at any given age. In general, it can be stated that the first two decades of life are concerned with the first stage (fatty streaking), the second two decades with the second stage (conversion of some of these fatty streaks to fibrous plaques), and the third two decades with the third stage (complication of lesions) of atherosclerosis (fig. 2).

But to return to the major thesis, how does lipid accumulate in the arterial wall? There is a growing body of evidence indicating that active metabolic work is performed by the mesenchymal cells in the inner layers of the arterial wall, that the arterial wall is indeed an organ, and that it is a potential target organ for hormones or hormonal imbalance.

Enzymes in the mesenchymal cells in the inner layers of the arterial wall must come into play before visible fat makes its appearance. It is probable that similar enzymes effect the transport of lipid moieties across the endothelial barriers, but it is strange that visible lipid has not been observed in the cytoplasm of endothelial cells. There is ample evidence that the simplest of building stones, labeled acetate and phosphate, can be utilized for fabrication into cholesterol, phospholipid, and other lipids by the perfused, sliced, or in situ aorta. There is no question about the ready diffusibility of these ions, but it is by no means certain that the major portion of lipid transport across the arterial wall occurs in this form. Thus, the problem is basically one of the relative importance of the transport of lipoproteins versus the transport of more simple molecules. And it is probable, from the natural history of the process of lipid accumulation and the ready dissociation between lipid concentration in the blood and lipid accumulation of the arterial wall, that lipoproteins must be enzymatically dissociated before passing the endothelial barrier and bathing the mesenchymal cells in the inner layer of the arterial wall.

STAGE 1	STAGE 2.	STAGE 3.	STAGE 4
Fatty Streak →	Fibrous Plaque →	Complications of Lesions →	Clinical Disease
0-19 years	20-39 years	40-59 years	over 40 years
Due to local accumulation of lipid (under enzyme-hormonal control ?)	Reaction to concentration of certain lipids (and incrustation of fibrin ?)	Hemorrhage Thrombosis Accretion Embolism Calcification	Myocardial infarction Stroke Gangrene

Fig. 2.—Concept of pathogenesis of atherosclerosis.

In summary, then, it would seem that the emphasis should be shifted to active metabolic work and that efforts should be directed toward the detection, concentration, and possible clinical utilization of active principles that govern lipid transport and local accumulation. The best available evidence points to these active principles being enzyme-hormone complexes.

Summary

Enzyme-hormonal principles that govern lipid transport at the cellular level appear to play a greater role in lipid accumulation in the arterial wall (stage 1 of atherosclerosis or fatty streaking) than do physicochemical factors governing filtration through the arterial wall. Other factors come into play in the subsequent development of these early lesions through stage 2 (fibrous plaques) and stage 3 (complication of lesions, as by hemorrhage and thrombosis) to stage 4 (clinical disease). Much confusion regarding human atherosclerosis can be

avoided by observation of interspecies caution and recognition of the probable stage of the lesions in man at any given age.

1542 Tulane Ave. (12) (Dr. Holman).

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PATIENTS WITH MULTIPLE INJURIES.—There were 9,500,000 accidental injuries in this country in 1957, with 95,000 deaths. . . . With increasing frequency we are confronted with persons injured in two or more sites and possibly affected in two or more body systems. The immediate problem is then saving life, to be followed after first aid by determination of the order of care of the various injuries in such a way that first things are done first. This can be accomplished only by organization. . . . The important factor in this organization is the team captain. In a large hospital this should be preferably a general surgeon, not a specialist. In a smaller community hospital it might well be a general practitioner. The function of the team captain is to take complete charge of this multiple injury patient. He should call on whatever specialists are required, but the treatment which they recommend should not be instituted until the captain orders it at a time when he believes that the patient can stand it. . . . It is the team captain's duty to remain with this patient constantly for as many hours as are required, giving all the orders, seeing all the x-rays and laboratory reports, discussing viewpoints with the specialists, changing the order of procedures as changing conditions require. This one man must accept the responsibility for the life of this patient. It is no place for two attending physicians or an attending physician and a resident to be both ordering, possibly at cross purposes. . . . Trauma and the first principles of its management . . . is not a specialty and it should not be, since it cuts across all parts of the human body. . . . With the extensively injured, no rules can be laid down to cover all cases, but there are certain principles to guide us, thereby not adding surgical trauma until it can be tolerated and not delaying reparative surgery until the progress of infection becomes more than the body can cope with.—R. H. Kennedy, M.D., The Appraisal and Management of Patients with Multiple Injuries, *The Surgical Clinics of North America,* December, 1958.

THE CLINICAL RADIOLOGIST AND THE PROBLEMS OF RADIATION HAZARDS

Wendell G. Scott, M.D., St. Louis

Mankind must learn to live safely in the artificial environment that is being created by the atomic industrial revolution. That this can be done is illustrated by the fact that 38 million radiologic examinations are done annually in the United States alone; diagnostic radiology is indispensable, and if it contributes to the shortening of life span and production of genetic damage such effects have not made themselves evident. The problem is first to understand and second to minimize the effects that can arise from diagnostic radiologic examinations. During the first 30 years of life the gonadal dose should be strictly limited according to published recommendations; in the later years of life, beyond the reproductive period, the gonadal (genetic) effects are of no clinical significance. However, exposure to ionizing radiation should be minimized by methods outlined here. People should not be frightened by confusing diagnostic radiology with thermonuclear warfare and should learn that the safe use and control of medical radiation depends on properly educating its users in the underlying sciences.

This is the nuclear age. From the time man first utilized fire, he has struggled to develop and then to master each new and more powerful source of energy. Significantly, he has also learned to protect himself from the hazards generated by them. Man is certain to do the same with the power and radiations arising within the atom.

We have been living in the formative period of the nuclear era for 16 years. The problem today is one of control of radiations so that man can live safely in the artificial environment which the atomic industrial revolution is creating. In essence, we must prepare now to safeguard a brilliant future by keeping all forms of ionizing radiation at the lowest possible level.

Public Health Aspects

The public health aspects created by the nuclear age are the responsibility of the medical and allied professions. The leadership in the medical use of radiations has logically devolved on the radiologists, the radiation physicists, the radiobiologists, the health physicists, and the geneticists. Their representatives constitute the National Committee on Radiation Protection as well as the International Commissions on Radiation Protection and on Radiological Units and Measurements. Since 1931, these bodies have formulated the standards for the safeguarding of patients, occupational personnel, and the public. Their recommendations have proved to be fully protective, practical in application, and effective without legislation—a remarkable record.

The work of these bodies provided the foundations for the handbooks on radiation of the National Bureau of Standards. These contained most of the recommendations emphasized in the 1956 reports of the National Academy of Sciences on "The Biological Effects of Atomic Radiation" [1] and of the British Medical Research Council on 'The Hazards to Man of Nuclear and Allied Radiations." [2] These reports served to focus the attention of the public on this subject, to publicize the genetic hazard that can accrue from small amounts of radiation, and to intensify the efforts of the medical profession to minimize radiation dosage from the use of x-rays.

Volume of Diagnostic Radiologic Examination.—Diagnostic radiology has had a tremendous growth because of the great contributions it has brought to the health and well-being of mankind. This was not due to accidental circumstances. It came about because it was and still is the means for lifting the cloak of uncertainty from medicine. Nearly every practicing physician either directly or indirectly utilizes the indispensable advantages offered by diagnostic radiology for the benefit of his patients. The total number of radiologic examinations and the films consumed per year are in the millions. Estimated annual numbers are as follows [1b]: 38 million roentgenographic examinations, with 32 million by radiologists; 118 million sheets of film; 13 million fluoroscopic examinations, with less than half by radiologists; 3 million photofluoroscopic examinations in hospitals; 189 million packets of dental films; 15 million to 18 million square feet of industrial film; and 128,000 roentgen ray machines, with 50% owned by dentists and 50% by physicians, osteopaths, chiropractors, and chiropodists (about 50% of general practitioners own diagnostic x-ray equipment, and the number of physicians owning equipment increased 50% from 1949 to 1955).

Professor of Clinical Radiology, Washington University School of Medicine.

Chairman's address, read before the Section on Radiology at the 107th Annual Meeting of the American Medical Association, San Francisco, June 25, 1958.

To keep these figures in the proper perspective, let us not forget that the great bulk is made on sick people, on those seriously ill with an obviously short life expectancy, and on those over 30 years of age. Nor should we overlook that during the past 50 years, simultaneously with the expansion of diagnostic radiology, the life expectancy increased from 49.2 to 68.07 years; the death rate from tuberculosis dropped from 194 to 9.1 per 100,000; infant mortality fell from 99.9 to 26.4 per 1,000 live births; and fetal deaths dropped from 23.9 to 17.1 per 1,000 live births. Also, American children today are said to be taller and healthier and have a lower death rate than before. Stone,[3] who assembled these statistics, points out that while radiology cannot lay claim to being the major reason for these great medical achievements it played a conspicuous part. His inference is that if radiations of this order contribute to the shortening of the life span and produce genetic damage they have not made themselves evident.

Deleterious Effects of Radiation.—In the assessment of the possible deleterious effects arising from the medical and dental use of x-rays, it must be clearly understood that (1) only small doses of radiation are used in clinical examinations and (2) the exposures are limited to local or segmental areas of the body as opposed to total-body irradiation. Many of those who emphasize the bad effects of diagnostic exposures do not distinguish between local and total-body radiation. The "roentgen" is the measure of exposure to each gram of tissue, and 1 r to a toe is vastly different than 1 r of total-body exposure.[3]

The deleterious effects of radiation of this order fall into two broad categories: (1) the somatic effects, which depend on the exposure to the body tissues and are primarily of immediate concern to the individual person, and (2) the genetic effects, which depend on the exposure to the gonadal tissues and are of long-range concern to the human race.

Somatic Effects of Radiation

Shortening of Life Span.—A somatic effect which has created consternation is the life-shortening in animals which have received whole-body irradiation. However, it has not yet been shown to result from low doses of the order of background radiation or from those used in diagnostic examinations, nor has it been shown to occur from segmental or partial-body irradiation. It has been described as an acceleration of the aging process rather than as a consequence of a specific radiation lesion. This complication apparently has a direct dose-size relationship, but such data are not available for man.

In 1956, Whipple[4] warned that a person who received the maximum permissible exposure of 0.3 r per week would accumulate a total dose of 468 r in 30 years, which might reduce the life expectancy of the exposed person about three years. Russell's[5] data from mice suggest that a continuous exposure at the rate of 15 r per year might result in a 3 to 5% shortening of the life span. Jones[6] estimated the life-shortening in man from exposure to radiation as 15 days per roentgen—a figure much higher than that of others. More recently, Failla[7] estimated a shortening of approximately one day per roentgen of accumulated dose from chronic exposure at a dose rate not in excess of 0.5 r per day, which amounts to three-fourths of a year.

Warren[8] concluded that radiologists die on the average of 5.2 years earlier than do other physicians. After a careful appraisal of Warren's data, Seltser and Sartwell[9] stated: "That the average age of radiologists at death is younger than that of other physicians cannot be ascribed to their exposure of ionizing radiation, since differences in age composition alone can account for the finding." A recent survey by Brown and Doll on 1,377 British radiologists confirms this opinion, for they conclude: "The expectation of life of British radiologists is similar to that of other men of comparable status and has not been substantially altered by their occupational exposure to radiation." From studies on radiation exposure to radiologists, Braestrup[10] concludes, "If reduction in life-span is proportional to the dose received, it may be inferred that radiologists using present safeguards, do not need to fear any significant future reduction in their life-span due to irradiation."

Leukemia.—Another somatic effect of concern is the possibility of inducing leukemia. For a reason as yet unknown, it has shown a real increase in incidence in the past 20 years. The suspicion that the expansion of diagnostic radiology may be related to this increase arose from the following observations:

Leukemia can be induced in animals as a result of large doses of whole-body exposure to radiation. Deaths from leukemia among U. S. radiologists are reported to be 10 times that of other groups of physicians, based on 8 cases in 173 radiologists over a 15-year period (1929-1943).[11] In England between 1935 and 1954, a total of 13,352 patients were given radiation treatment with large doses for ankylosing spondylitis and 38 cases of leukemia appeared.[12] In 1,400 infants and children who received deep x-ray therapy for "thymic enlargement" over a 25-year period, 7 cases of leukemia were found (1926-1951).[13] The incidence of leukemia in the 98,000 survivors of the atomic blasts near the hypocenter at Hiroshima City was 12 times greater than those at the periphery. The total number of known cases of leukemia among the 194,000 exposed survivors at Hiroshima and Nagasaki up to 1955 is 93.[2] No cases of leukemia have been reported during the first decade in Japanese children who were irradiated in utero by the atomic bomb. Stewart and associates[14] reported that children of mothers who received radiation exposure to the abdomen from diagnostic procedures while pregnant developed leukemia nearly twice as frequently as the controls—42 as compared to 24. In this situation, the fetus received total-body irradiation. However, in those mothers who had diagnostic x-ray examinations of other portions of the body there was no increase in the number of children developing leukemia.

This is a total of 188 people developing leukemia after total-body or near total-body irradiation, 93 of whom were irradiated by atomic bombs. This is a small number on which to base sweeping conclusions and is inadequate to establish the linearity effect of radiation in leukemia. Lewis,[15] however, ably presents the argument in favor of this concept.

Of equal importance in assessing the leukemogenic effect of radiation is the series of 640 women treated by Kaplan [16] for infertility by irradiating the ovaries; in neither they nor their offspring for two generations have leukemia, lymphoma, or cancer developed. Likewise, no cases of leukemia have appeared in Arneson's series of 350 women with primary carcinoma of the cervix who have been studied 5 to 20 years; all received heavy external x-ray radiation and local radium treatments.

Brues, discussing the somatic mutation theory as the cause of leukemia, states: "There must be something besides one mutation in one cell. Maybe it might be in two or three mutations in the same or adjacent cells in which case it would not be a linear relation. It might possibly be a combination of things with which radiation has nothing to do. We just don't know."

In summary, it is evident that total-body irradiation by either large single or cumulated doses causes an increased risk of developing leukemia, and unnecessary exposure to ionizing radiation should be avoided. We have no precise knowledge of the incidence of leukemia under conditions of chronic exposure. The somatic effects from radiation present an ever-constant threat to occupational personnel but pose only a remote threat to the patient undergoing a diagnostic examination; those who have followed the recommended precautions and the directives on protective barriers have not sacrificed any appreciable period of their life span or incurred a serious risk of developing leukemia.

Genetic Effects of Radiation

The problem, then, is first to understand and second to minimize the genetic effects that can arise from diagnostic radiologic examinations. The inheritance mechanism is by far the most sensitive to radiation of any biological system in the human body. To quote from Glass [17]:

> One must begin to think of mutations of the hereditary material in terms of its chemical nature. . . . Chromosomes, the carriers of the genes, are composed of deoxyribose nucleic acid (DNA), some ribose nucleic acid (RNA), a considerable basic protein (histone), and a little protein of a higher molecular weight. The evidence indicates that the genetic information is coded primarily in the DNA. . . . Mutations are alterations in this material which, when chromosomes reproduce themselves, are themselves replicated and thus transmitted through mitotic cell divisions.
>
> The hereditary material is of course present in the nuclei of all cells, not of reproductive cells alone. Any damage done to it is transmitted through mitoses to all the somatic descendant cells. Many, if not all, genes are concerned with presence and specificity of particular enzymes, each of which governs some particular step in the metabolic pattern. When a mutation impairs the specificity of an enzyme and thereby blocks a particular metabolic step, the usual outcome is fatal unless the cell has some alternative way of supplying its needs. . . . This is not serious if there are uninjured cells to take its place. Only if the damaged cell is irreplaceable, or stimulated to abnormal activity and multiplication at the expense of other cells, such as in leukemia or cancer, is the fate of the entire organism imperiled. If great numbers of somatic cells are damaged genetically, the effect may be severe, even though not uniform in character. Thus, most mutations do not result in conspicuous abnormalities, but are manifested as increases in the types of abnormalities, disease, and death that are already occurring.

Furthermore, radiation acts blindly, not selectively, on certain genes and not on others, which explains why the vast majority of mutations are deleterious. In genetic damage to the reproductive cells, the hereditary defect will be present in every cell of the offspring to whom it is transmitted via egg or sperm and no tissue can escape the consequences of the defect. The sole safeguard in each of such cases is the general probability that the *set of genes inherited from the other parent* will not carry the same defective genes.

It is not possible to make a simple, noncontroversial statement concerning the implications for man of the genetic effects of radiation. There is, however, general agreement among geneticists on the following basic concepts which have been extrapolated from data on the fruit fly and mice: 1. Apparently no threshold dose is required to produce a deleterious effect. 2. Once damage is done, it is largely irreversible. 3. The effects are probably cumulative over the years. 4. The result of genetic damage is to produce deviations from the norm in the offspring of the irradiated parents. 5. These deviations or mutations are almost always *undesirable. Their offspring are called mutants.* 6. Mutations produced by radiation are in no way different from mutations which have always been occurring in the human race. 7. The mutants are characterized in general as follows: decreased longevity, increased susceptibility to disease, decreased fertility, and usually recessive or masked so that the first-generation offspring do not bear the full brunt of the genetic damage. Thus, contrary to public opinion, freaks and monstrosities do not often occur in the first generation after a mother is irradiated. Usually the deviations caused by the damaged gene in the first offspring are so minute and subtle that recognition is extremely difficult. The full expression of the damage comes in subsequent generations when there is a mating of those with similarly damaged genes.

There is a certain level in the mutation rate which is known to be normal for the human species. The concern of the geneticists is that this level may be significantly raised from the widespread and increasing use of ionizing radiation. It has been estimated from Drosophila flies and mice experiments that a gonadal dose of 30 to 60 r to each person in the entire population would result in a doubling of the normal mutation rate. The geneticists fear that such a possibility would be disastrous for the perpetuation of the race. Remember that the geneticists are interested in total population doses, i. e., "x" millions of roentgens per "y" millions of persons in the reproductive age. Persons beyond the reproductive age can have roentgenographic examinations without fear of genetic damage.

TABLE 1.—*Seven Types of Examinations Yielding Surface Dosage in Excess of One Roentgen over Gonads**

Examination	r†
Angiocardiography	1.5
Excretory pyelography	2.25
Pelvimetry	4.9
Lumbosacral spine	5.4
Upper gastrointestinal (fluoroscopy plus roentgenography)	5.7
Routine spine	5.8
Hip and pelvis	8.8

* Data from Hodges.[18]

† Doses are given as surface values, and, obviously, gonadal doses are measurably less, especially in the female.

The Committee on Genetic Effects of Atomic Radiation of the National Academy of Sciences [1a] recommends that during the first 30 years of life the average gonadal dose for large populations should not exceed 10 r of man-made radiation plus the 4.3 r from the natural background sources. Persons should not receive a total cumulative dose to the reproductive cells of more than 50 r up to the age of 30 and not more than another 50 r, or a total of 100, to the age of 40.

It would be of great help in determining the extent of the genetic problem if we knew the average gonadal dose the population was now receiving from medical and dental sources and how it compares to natural background radiation. Laughlin and Pullman [1b] attempted to do this by a survey of the literature and estimated it to be 4.6 r ± 3 in a preliminary report that has not been officially released by the National Academy of Sciences. This figure is based on data of varying reliability. The report in October, 1957, by the International Commission on Radiological Protection and International Commission on Radiological Units and Measurements states, "Enquiries up to the present have not revealed any records detailed enough to use for the proper assessment of the gonadal doses to the population," and concludes, "Consideration of methods of arriving at the genetically significant annual gonad dose, to the population from medical exposures is the most important immediate objective." In a subsequent paper, Laughlin and associates discuss the studies and surveys that are required for obtaining the necessary information to develop this figure. The United Nations Scientific Committee on the Effects of Atomic Radiation requests the cooperation of the medical profession in supplying records for this purpose. Until this is done and an accurate estimate of the genetically significant gonad dose determined, we must be extremely cautious about accepting or formulating quantitative inferences from diagnostic x-ray procedures. Sonnenblick reminds us that those "which have appeared in scientific literature and publicized in mass media can only be regarded as 'best guesses' and conclusions drawn cannot be considered as definitive." In other words, one must be most careful in the interpretation of studies on uncontrolled data.

To summarize, the science of genetics has become of clinical importance. Ionizing radiation in small doses unquestionably can increase the mutation rate in the hereditary material and any increase in the mutation rate is undesirable for the human race. No matter what the present average gonadal dose is, it is too high if it can be lowered.

Means of Reducing Gonadal Exposure

These conclusions are not a pronouncement of doom for radiology. They are a challenge and a stimulus to do a better and a more careful job. Just as there are advances in other fields of medicine from the development of new knowledge and ideas, so there are in genetics and radiology. New roentgenographic techniques and procedures have to be developed, old ones modified, and others discarded. With use of present-day developments radiation dosage from the medical use of x-rays can be reduced by 75 to 85%.

It can be accomplished while preserving the value and without impairing the efficiency of the diagnostic examination. To bring this about, it is necessary that physicians have a sound understanding of the hazards as well as a knowledge of how to use diagnostic radiology and how to employ protective measures. To aid in this undertaking, the American College of Radiology (aided by a grant from the Rockefeller Foundation) has distributed to all practicing physicians "A Practical Manual on the Medical and Dental Use of X-rays

TABLE 2.—*Frequency of Utilization of Examination Carrying High Gonadal Dosage, 1956-1957**

Examination	Times Used	Patients Aged Under 30 Yr. No.	Patients Aged Under 30 Yr. %
Upper gastrointestinal	4,804	602	12.5
Routine spine	1,132	260	23.0
Lumbosacral spine	2,122	544	25.5
Excretory pyelography	1,795	525	29.0
Hip and pelvis	2,538	909	35.5
Pelvimetry	370	260	70.0
Angiocardiography	147	115	78.0

* Data from Hodges.[18]

with Control of Radiation Hazards" (copies of this manual may be obtained by writing directly to the American College of Radiology, 20 N. Wacker Dr., Chicago). It is well for physicians who do fluoroscopic and roentgenographic examinations to realize that they have a greatly increased liability because of the possibility of inducing genetic damage by radiation.

The physician who first examines the patient assumes the responsibility for determining if the possible benefits of the examination outweigh the possible hazards. If in doubt, he should consult his radiologist. This is a just responsibility of the attending physician and one which must not be compromised or restricted by the enactment of legislative controls. Above all, we must not forget that our primary concern is with the welfare of the patient. The health of future generations is based on the health of the present generation.

Fortunately, about 85% of the total diagnostic (gonadal) dose arises from six or seven types of examinations, which constitute only about 10% of all examinations. Hodges[18] found that only seven standard procedures exposed the gonads to radiation in excess of 1 r per examination and that these constituted only 20% of his annual total of 64,076 examinations. Table 1 is a list of these procedures arranged in order of magnitude of gonadal dose.

In table 2 is listed the frequency of the seven examinations carrying high gonadal dose arranged in the order of increasing numbers of those that are given to patients below the age of 30. These total 3,215 cases, or only 5% of the total of 64,076 examinations, indicating that only a small percentage of roentgenographic examinations are performed on persons under 30 years of age. They are only a few patients in any one working day, and so their protection with gonadal shields does not constitute a burden for the staff.

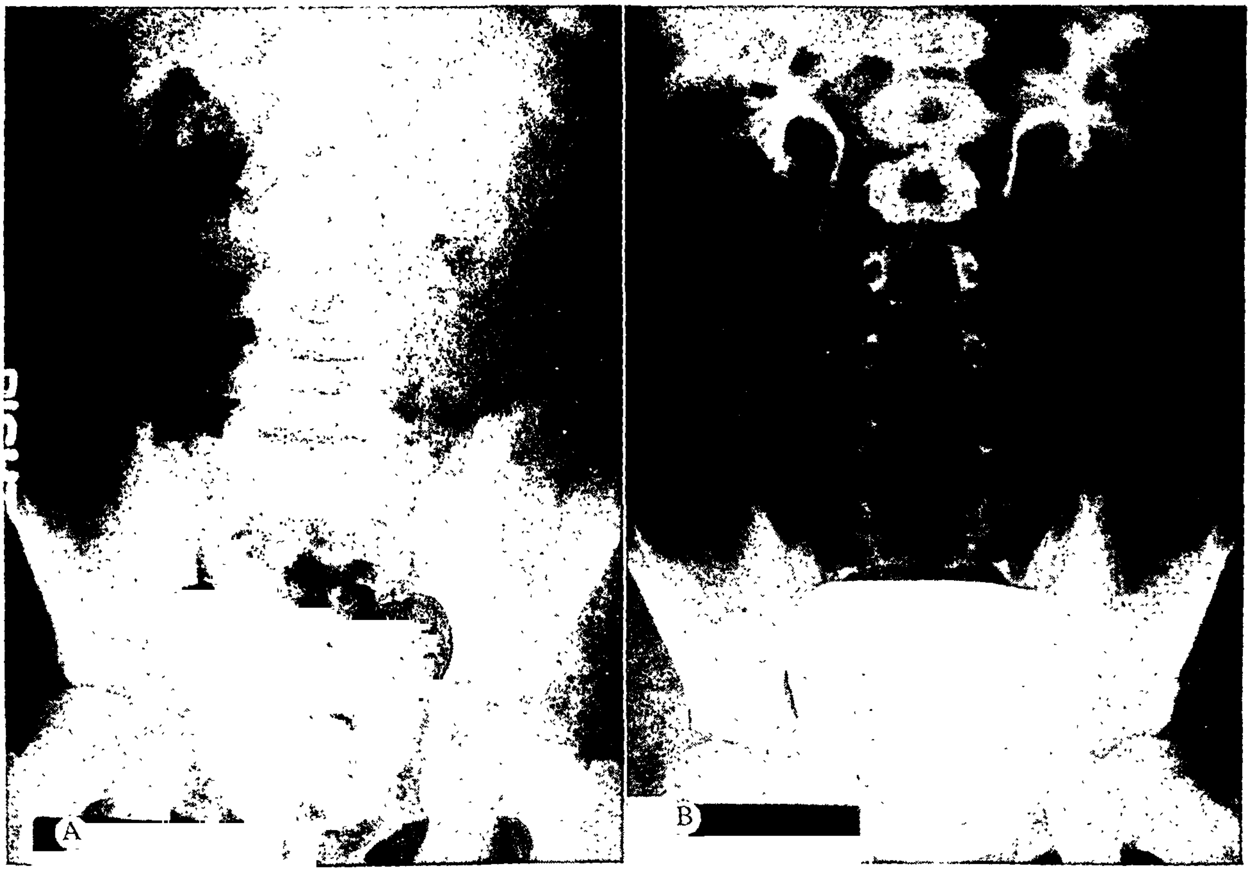

Fig. 1.—*A*, preliminary roentgenogram of urinary tract of 12-year-old girl prior to intravenous pyelography (made without gonadal shield for detection of possible urinary calculi). *B*, subsequent pyelograms made with lead shield cut out to cover pelvic inlet to reduce radiation exposure to ovaries.

The adoption of three fundamental practices can result in an appreciable reduction in the gonadal dose: 1. Diagnostic examinations should be performed by physicians with training in radiology and by experienced x-ray technicians. The examinations must be of standards acceptable to other physicians to whom the patient may be referred to avoid having the examination repeated. 2. Written reports and films of each examination must be preserved so that they may accompany the patient if he is referred to another physician, hospitalized, or transferred to another city. 3. The initial examination should be made carefully. The patient should be properly posed, and he should be kept under control to avoid unsatisfactory films and the necessity of retaking them.

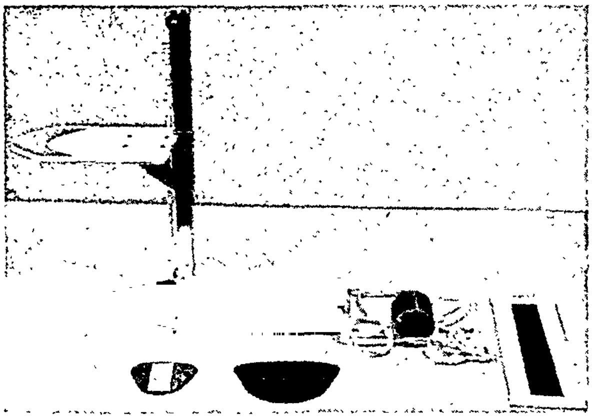

Fig. 2.—Collection of various devices for shielding gonads: testicular shield on adjustable stand (Hodges); molded lead cup for shielding testes (may be tied in place to permit placing patient in various positions); lead sheet cut out to conform to pelvic inlet for ovarian shield; heavy lead-rubber sheeting (used for same purpose); and rectangular lead-rubber sheets, used in many examinations as gonadal shields in either males or females.

A guiding directive for lowering gonadal dose might be as follows: Scrutinize every examination for ways of minimizing gonadal dosage. With this objective in mind, let us see what can be done at the present time.

First, consider the appropriateness of the examination and equipment: (*a*) have a solid reason for the examination—it is doubtful if many unnecessary examinations are being done because the need is being more carefully evaluated and the expense serves as a deterrent; (*b*) take only the films that are required to elucidate the examination—eliminate nonessential views; (*c*) discourage health-insurance policies that include "free" x-ray examinations, and encourage policies of the deductible type so that the patient must pay for a portion of the initial examination; (*d*) limit fluoroscopy to specific purposes, especially in children, for it yields the highest gonadal dose, the gonads are more difficult to shield, and it can result in whole-body irradiation to infants—keep in mind that one minute of continuous fluoroscopy can be equivalent in radiation to 400 chest films; (*e*) have a radiation physicist survey your roentgenographic and fluoroscopic equipment for possible "leaks," obsolescence, output in roentgens, adequacy of protective barriers, and provisions for protection of occupational personnel; and (*f*) teach x-ray technicians the importance of lowering gonadal exposure—they must know the "why" for each factor employed because the largest exposure reduction results from the correct technique the first time without having to make corrections and repeat the examinations.

Second, reduce the quantity and improve the quality of the x-ray beam (reduce entrance skin and integral dose) by the following means: (*a*) addition of 2 mm. of aluminum filtration to roentgenographic tubes and 3 mm. of aluminum filtration to fluoroscopic tubes (gain in dose reduction 50%+); (*b*) increase target-film distance to 36 or 40 in. for roentgenographic work and target-table distance for fluoroscopy to 18 in.—the increased distance produces less exposure to the patient in relation to the amount reaching the film or screen (gain in dose reduction 10%+); and (*c*) collimate diagnostic beam to the smallest area that covers the part to be examined—adjustable multileaf diaphragms with rectangular apertures can reduce stray radiation as much as 20 to 30% over circular cones—and, in this connection, we must continue our efforts to develop techniques that will provide objective evidence on the roentgenogram that the exposure was confined to the area under investigation (gain in dose reduction 15-30%).

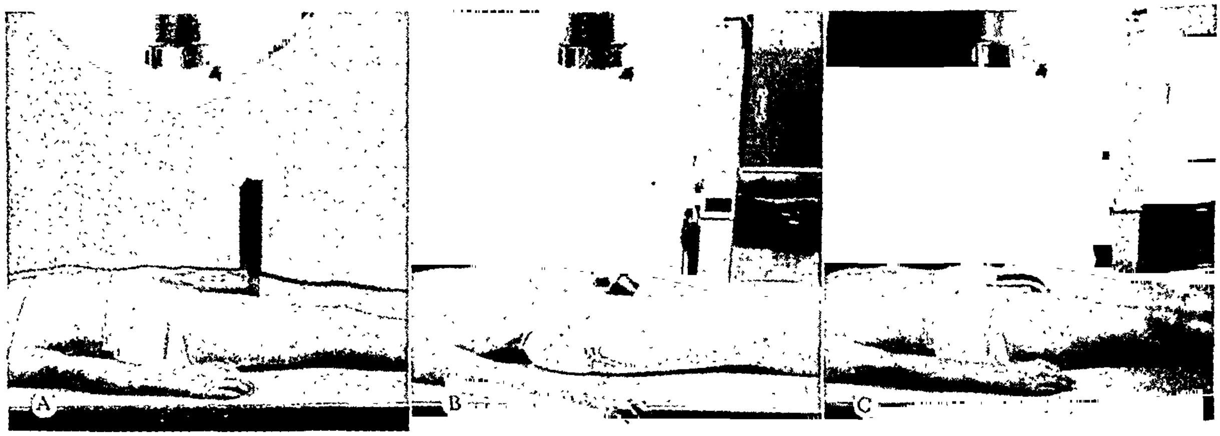

Fig. 3.—Three different methods of using testicular shields: *A*, Hodges' stand; *B*, molded lead cup; and *C*, lead-rubber sheeting.

Third, increase effectiveness of film dose by the following means: (*a*) use the new film with fast emulsion (gain in dose reduction 40-50%); (*b*) use high-speed intensifying screens (gain in dose reduction 40-50%)—fast films plus high-speed screens alone can yield a 75% reduction; and (*c*) process films with time and temperature control with use of the recommended chemicals for fast film (Spenodone hydroquinone developer reduces film dose 20%) (gain in dose reduction 5-20%).

Fourth, investigate use of special equipment: (*a*) phototiming, which is of decided help in preventing overexposure and underexposure and, therefore, in decreasing the number of reexaminations, and (*b*) fluoroscopic image intensifiers, advantageous in reducing exposure to both patient and operator in prolonged fluoroscopic studies, such as in cardiac catheterization and myelography.

Fifth, utilize gonadal shielding devices (fig. 1): (*a*) lead, lead-rubber, or lead–glass-fiber sheets or aprons or lead barriers to cover the pelvis for most radiographic procedures (fig. 2) and (*b*) special devices as shown in figures 3 and 4—adjustable tripod stand (Hodges), molded lead cups for males, lead or lead-rubber cutouts conforming to pelvic inlet for females (fig. 1), and lead-rubber snap-on diapers for infants (considerable gain in dose reduction).

Sixth, note special protective measures for pregnant women (30% of all gonadal dose comes from obstetric radiography): (*a*) reduce to a minimum roentgen exposures to the pelvic area of women in child-bearing age in the two weeks after the last menstrual period to preclude the possibility of irradiating the embryo and (*b*) when possible, delay abdominal and pelvic exposures on pregnant women until the last trimester.

Comment

The careful exercise of these practices not only will materially lower radiation dosage to the germinal tissues but will avoid a severe restriction of survey examinations in public health and permit the inclusion of new radiologic procedures that will be developed in the future. The purpose of this study is to show how the dosage can be lowered for almost all examinations. It is not a plea to reduce the number of radiologic examinations below that required for the highest quality of medical practice but to support their utilization through a lowering of the gonadal dosage.

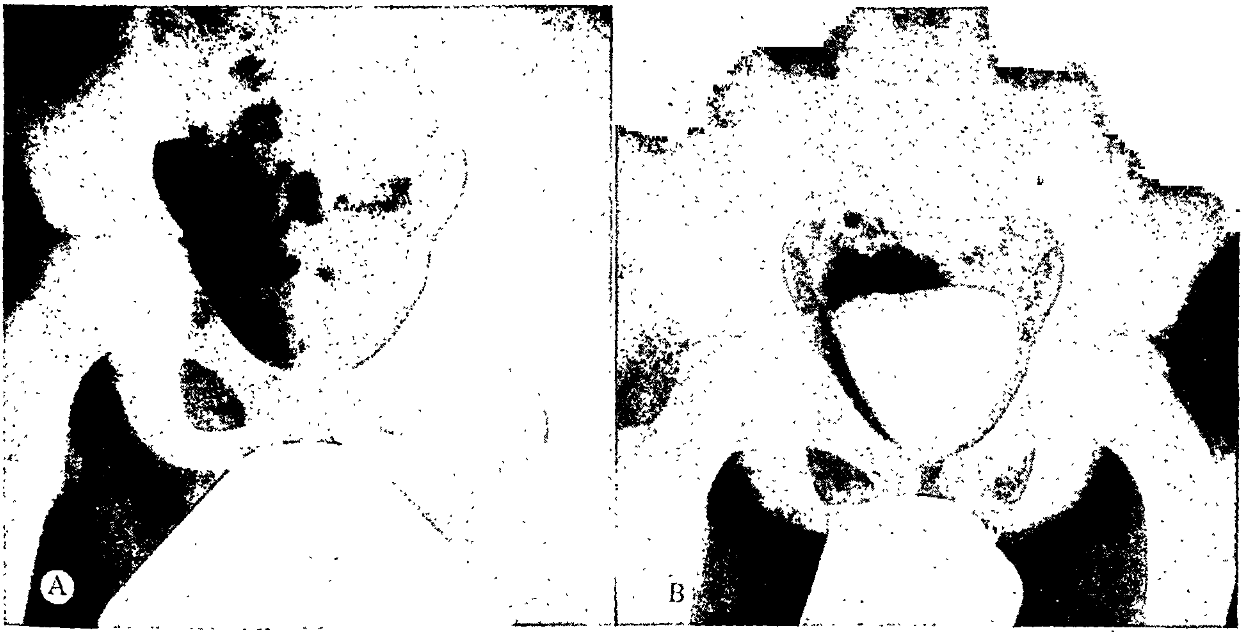

Fig. 4.—*A*, roentgenogram made with Hodges' testicular shield in place. It does not obscure bones of pelvis or hinder examinations of hips and femurs. *B*, roentgenogram made with molded lead cup in place, obscuring only small area of inferior pubic rami, yet affording complete visualization of hip joints and bladder for cystograms, as in this case, and not obscuring information in intravenous pyelograms.

Conclusions

The time has arrived to (1) develop a calm and mature attitude toward the nuclear era, an era that holds great promise for the betterment of mankind; (2) put an end to the psychological scare about medical radiation and stop confusing it with thermonuclear warfare, with acute massive or chronic whole-body irradiation, and with the restrictions for those occupationally exposed; (3) have every physician using diagnostic radiology exert positive efforts and means to keep radiation dosage to the gonads to the lowest level consistent with the best standards of medical practice (as radiologists, we must set the example); (4) acknowledge that radiation to the germinal tissues can be reduced by 75 to 85% without impairing the efficiency of diagnostic examinations; and (5) realize that the key to implementing the safe use and control of medical radiation lies in the education of all practicing physicians in the fundamentals of genetics, radiobiology, and radiology.

100 N. Euclid Ave. (8).

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RESEARCH AND TRAINING

Conrad A. Elvehjem, Ph.D., Madison, Wis.

Education is a human experience, and methods of training are many and varied. Medical education, perhaps better than any other field, illustrates the progress of teaching through the years—how new ideas and methods developed and how the best of them were carried forward and augmented by later ideas and methods.

History of Medical Education

Dr. William S. Middleton traced this history some years ago, when he was dean of the University of Wisconsin Medical School, from its origin in the priesthood of antiquity to the modern medical school. In the evolution of Greek culture, medicine was eventually separated from the priesthood. The first medical school at Alexandria, founded by Alexander of Macedonia, trained such notable medical figures as Herophilus, Erasistratus, and Galen. With the Roman conquest of Egypt, the school at Alexandria was disbanded, and it fell again to the church to bridge the gap until the establishment of the next formal medical school at Salerno in the ninth century.

The torch of medical education lighted at Salerno was kept bright for at least four centuries, but its decline Dr. Middleton put at the 13th century when the medical leadership passed in turn from Bologna to Naples to Montpellier to Paris. True academic tradition in pageantry and form dates from the University of Paris. In France, surgery was separated from medicine. Leyden, Edinburgh, and London gained ascendancy in medical education in the late 17th and 18th centuries. The first medical school in North America was estab-

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President, University of Wisconsin.

Read before the 55th Annual Congress on Medical Education and Licensure, Chicago, Feb. 9, 1959.

lished at the College of Philadelphia in 1765. Until then, an apprenticeship system of medical education had prevailed in the United States.

While formal medical education showed a mushroom growth in the 19th century, the pattern of medical apprenticeship persisted in varying degrees throughout this period and, in a changed and restricted form, does today. The opportunity to read in an established physician's office was a coveted method of introduction to the study of medicine almost to the end of the 19th century in this country.

The formula for the first organized courses of medicine in America, Dr. Middleton reported, differed in no wise from the European or the British pattern. Classroom lectures and demonstrations were the rule. Personal dissection by the medical student was the exception.

Yet, among the leaders in medical thinking, there had long been the feeling that laboratory work—research if you will—was a vital part of medical instruction. This I have on the authority of Dr. Walter J. Meek, who, I might add, was the best teacher I ever had in my years of study at the University of Wisconsin. I might explain that I have never had the privilege of taking a formal medical course. Perhaps that is why I have been asked to speak on medical education.

But, seriously, my experience in teaching in allied educational fields has given me a respect for the combination of research and teaching, which may not be universal in the medical field. However, Dr. Meek not only was convinced of the effectiveness of this combination but felt that he was not alone among teachers with this point of view when he spoke briefly about it some years ago. This is what he said:

> Historically, research is probably quite as old an activity as teaching. Hippocrates, whose original works are not even preserved, was a clinical investigator of no mean merit.
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> Aristotle would rank with present-day research embryologists. Both were teachers and research workers. However, the two activities were almost entirely separated from each other.
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> When the master was a teacher, he donned his cap and gown, sat on a high stool, and read a book to the students. When he became a research worker he retired, often in secret, to a room in his house fitted up as a laboratory and he was accompanied only by a helper who might or might not be a student. The laboratory did not become a part of the professor's official equipment until the Italian Universities flowered at the end of the 16th century. Even for centuries after that, teaching consisted not in performing experiments or presenting very many demonstrations, but in reading what some authority had written on the subject. It was in this way that the books of Galen for 1,300 years became the scientific bible. Theoretically and practically anyone who could read, could teach.

The lecture, just like the apprenticeship, is still, in somewhat modified form, a backbone of our teaching today. A junior at Marquette University School of Medicine recently reported that he had listened and had taken notes in more than 1,400 lectures during his first two years of formal medical education. I have never measured our own program in this fashion, but I trust that ours, and most others, rely just about as heavily on the lecture method of teaching.

And I do not say this in criticism, for the lecture is a very efficient teaching method, but it is an immeasurably stronger method when coupled with experience. This is true for both teacher and student. Without experience, there is no way a lecturer can exercise scientific comparison or judgment, except on hearsay evidence.

Teaching can best stimulate the mind of the student when the mind of the professor is alive and questioning, as someone has put it, "when he is continually seeking new knowledge that will justify or correct his earlier impressions, when he kindles in the mind of the student by his own fire that lamp of truth which reveals all knowledge as an age-long and immortally unending search."

My first point, then, is that teaching must be a continual process of education for the teacher and that it can be carried out satisfactorily only when he constantly tries to enlarge his knowledge and test his ideas by an experimental method, which is research. I think that most of us can agree on that point.

The Student's Motives in Research

It is the second point in this regard on which we may have some differences of opinion. This is the value of student research in the teaching process. This point might best be put in the question: "How far should we go in encouraging a medical student to do research during his training career, and how can research activities be integrated with other teaching methods?"

Everyone in education does or certainly should recognize that the process of learning depends on how the student feels about what he is learning. If his feeling is negative, the learning will be negligible. If he wants to learn, learning can be much more rapid. Thus, the factor of motivation becomes a very important one.

In the field of medicine, many students are highly motivated often from a very early age, and this motivation is strengthened throughout training. However, I think it is important to keep in mind that every student has his own set of motivations, in medicine as in every other endeavor. Some may see in medicine a highly lucrative career and yearn only for the diploma as a certificate of a gilt-edged credit rating. These are not likely to be really educated by any method, and, for the sake of the profession as well as all humanity, it is best that they be denied admission to medical training. Some, and these include many of our best practitioners today, may be highly motivated by a desire for service, a hope to alleviate suffering and to save human life. A third group might include those who marvel at the wonder of nature that is man and want, more than anything, to understand more and more about this creature.

There are, undoubtedly, many more primary motivations to consider, but these latter two are enough to confuse us in planning medical education. I would like, however, to offer some evidence of the value of research in the education of both of these groups.

Let us examine first the last of my examples. A member of this group is likely to be the rugged individualist, often a nonconformist, who has an intense curiosity about natural phenomena, an ability to generate abstract ideas, and a strong desire to know. It is from this group we are most apt to develop the research men, the mature teachers, and the specialists in highly advanced fields.

To plunge them, as early as possible, into the challenging world of research in an atmosphere of freedom under the restrained guidance of a leader in their particular field of interest is, perhaps, the best educational experience we can offer. For these are minds and attitudes which need little more encouragement than a problem to confront. They are like horses bred for jumping—you need only head them toward the barrier.

The problems they discover in the laboratory will concentrate their interest on the lectures and demonstrations, especially when these offer basic material that can be applied to their research. They are inclined to be impatient with the old master who reads from the book or "Herr Doctor" who, leading them on rounds, expects his quick guess to be taken as Bible truth. But they will intensively pursue knowledge on the rounds, in the classroom, and in the library, and, while we may be hard pressed to endure their impatience and not a little hurt by their irreverence in the face of age and experience, at some future date we may well be proud to drop their names as "one of my former students" at gatherings such as this. For it undoubtedly will be one of them who will help unravel the mystery of cancer, help us stem the deteriorations of aging, help reverse the trend in mental illness.

Yet, if we cut our finger, we might not choose them first to bind it up; theirs is not an interest in easing our pain but rather an understanding of the meaning of pain itself or of the velocity of the blood flow through the cut or even of the effects of an uncleaned wound.

Again, I do not say this in criticism, for their motives are clear and honorable. Their satisfaction is not in direct service but in ultimate service. They are the sort who can give half their patients a promising drug and the other half placebos, knowing that the second half will suffer in consequence. To prove that the first half will be either helped or harmed is their satisfaction. They are best trained and kept in the laboratory. I have a feeling you might agree.

Research in Training for Direct Service

It is, of course, the group of students motivated in medicine by humanitarian considerations who raise the basic question of the value of student research in teaching. Their satisfaction is direct service. Their rewards, I might interject, are likely to be more direct and in the coin of the realm.

They have the ability to work in and with an organization and the desire to solve specific problems of immediate concern. They are not only the general practitioners but the specialists in some of the more static fields. They often have what we laymen blasphemously call a "bedside manner." Incidentally, they can do a good clean repair job on our cut finger and be genuinely sympathetic about it, too.

Why should they be subjected to the rigors of research? They usually are willing to accept the truths of the book or the old masters. It is not necessary ever to put your hand in a flame to determine that it is hot, if you will just believe your mother. Why should we force these young people to put their hands in the flame?

First of all, while it may be hard on their hands it is good for their minds. Some today say that every educated man should understand the methods of science. "Our progress in science and technology," James R. Killian has pointed out, "will be advanced by our educational success in still another area—the achievement of a high degree of scientific literacy among the rank and file of Americans." And he adds, "A man cannot be really educated in a relevant way for modern living unless he has an adequate understanding of science." It would seem to follow that a man whose ministrations are based on a science should, himself, understand its methods and that understanding of the scientific method can only come from personal experience: research.

A second reason has been suggested by the anthropologist Margaret Mead. She recently discussed the transmission of knowledge and pointed out that it has both vertical and lateral movement. The outpouring of knowledge from a wise old teacher into the minds of young people is vertical transmission, and very efficient it is if the concentration of knowledge is high and the receptacle is open. The lateral transmission of knowledge is learning together, the sharing of the pleasures of discovery between the young and old. This is even more efficient, for it requires activity on the part of the student—activity which is likely to enhance retention.

The Lebanese poet Kahlil Gibran describes great teaching thus: "A teacher does not bid you enter the house of his wisdom, but rather leads you to the threshold of your own mind." This is the process of joint learning. This is student research.

A third reason for student research in medical teaching is again motivation. Granted, the student group I now am discussing is not motivated primarily by curiosity. Yet its motives can be broadened and, I believe, bettered by research. Let me explain with a personal example:

It concerns my reading of the *Journal of Biological Chemistry.* In my laboratory days it was my habit to take each issue of that journal home, as it arrived, and spend an interesting evening looking through all the papers, reading some but scanning most. However interesting I found the papers on many subjects in this reading, I discovered that I did not thoroughly digest their contents, except when they related to my field and I read them a second time.

I am thus inclined to believe that a student can read religiously his medical textbooks and listen patiently to his medical lectures without fully comprehending what he reads or hears, unless he has had direct experience—research experience—which prompts more thorough study.

This brings me to the fourth and final value I want to cite for exposing this group to research as a part of its medical education. Understanding the methods and challenges of research will help give these people both patience to live with the inadequacies of our present knowledge and trust in the eventual success of our scientific efforts.

Our early impression gained from the surprise success of our atomic research led many to think that if we just assembled enough money and scientists in one place, we could do almost anything. Later, when we learned the tortuous and discouraging path that led to this discovery, we gained more respect for the brilliant minds which conceived the theories and the almost superhuman courage of those who brought the experiment to success.

It is this latter lesson that is important for the physician at the bedside to have learned. He can learn it best if he, himself, has faced research challenges. And with this knowledge he can be of inestimable aid to the man at the research front, for he can direct his problems and his field findings to those who can correlate and apply them, experiment on them, and perhaps improve our knowledge of them.

Let me give you an example of this sort of aid to the scientist, which many of you will recognize. I am particularly familiar with this situation because it involved a colleague in my department, Karl Paul Link.

It may not be necessary for me to explain that the University of Wisconsin is a state, land-grant institution, widely recognized for its efforts to make its unique resources as useful as possible to the people it serves. We have told the people of Wisconsin over and over again that if they have a problem that is beyond them to solve to bring it to the university. To facilitate this referral of problems, particularly in the agricultural area, we have county agents throughout the state who are trained to be alert to situations which would be benefited by scientific investigation.

As a result of all this there was unloaded on our doorstep one day one dead cow and a bucket of blood—and the serious problem of farmers in many areas of the northern plains states, sweet clover poisoning. Dr. Link's work, prompted by this problem, led him to bishydroxycoumarin (Dicumarol) and warfarin, and the rest of the story you know better than I do.

Let me stress the point, however, that it was knowledge of and faith in research that led to the solution of the farmer's problem and to subsequent medical benefits undreamed of at the time. The impetus did not come from the laboratory. Thus, I do not think it is possible to put too high a value on a medical profession trained, through research, to recognize and refer problems that science can attack and solve.

Particular Problems in Training

Now I recognize the fact that I have oversimplified the problem. I have barred from medical school those whose motives are money and treated those whose motivations are humanitarian and those motivated by curiosity as distinct groups. In medicine, particularly, we recognize that there is a considerable gray area between the blacks and whites, and, in reality, this area is rising to new prominence.

I speak now of the particular problems involved in the training of those specialists who must be called on for clinical work yet whose area of specialization is so fast-advancing that it is hardly out of the laboratory stage.

Let me select but one field out of the several in the category and discuss it briefly. Cardiovascular surgery is such a field. In work of this nature, the students often are postgraduate, the instruction highly specialized. It is not uncommon that the research team and the clinical team are of the same personnel composition. Yet it also is not uncommon for an internship to be served in such endeavor without the ultimate goal of concentration in this specific field.

In a recent symposium on experiments in medical education as they relate to cardiovascular teaching, which was part of the Fourth Conference of Cardiovascular Training Grant Program Directors, there was considerable discussion of research or project teaching. It was here concluded that the students' experience is the goal of such teaching. He learns that there is no perfectly designed experiment, and this comes as a shock to him. He gradually accepts this as being a real and necessary thing. The value is in student experience, this group stressed, not in research results. Its over-all value, this group found, is to provide the student with a critical attitude which will enable him to become a more astute observer in the evaluation of a problem.

Yet this group found it difficult to determine whether a "carry over" results. On completion of internship, it was reported, individual students refer to their project teaching participation as a favorable experience. It was admitted that under the voluntary programs the student participation is usually composed of the better type of student. It was recognized that a large percentage of these students ultimately pursue a career in academic medicine. In assessing the results of the program, it was stressed that one must have an impression of the effect of this teaching method. Dr. Robert F. Pitts of Cornell University put it this way: "It is not an impression that you have altered the attitude of a student. That his attitude has changed is not an impression; it is a reality. It is my impression that this is good."

Economic Needs in Research

Now, if I may, I would like to close on the traditional theme of all college and university presidents—money. Lectures provide economical teaching. Demonstrations, preceptorships, and clinical instruction are not too expensive, unless it is necessary to operate a hospital to provide them. But research is expensive. This is one of the reasons why some minimize it in the teaching program. But I am so convinced of its value that I feel special attention should be given to the problem of its financing.

And there are some special needs which I would like to call to your attention. Not only does research require extra space, equipment, and supplies but it removes the student from service in routine tasks and he must be replaced by a technician. Thus, extra funds are needed for the obvious research costs and, also, perhaps in the form of fellowships, to free the student from routine duties.

I call this to your attention not in preparation for passing the hat among you but rather to make you aware of this special need and to solicit your influence in meeting it. You may recall that some time ago I mentioned the word freedom in connection with the atmosphere which is necessary for productive research. Such freedom can be facilitated by unrestricted fellowship support, support which does not tie the young experimenter to a team program under a dominant director who controls research through a tight hold on the purse strings.

Again, I want to point out that the thoughts I have expressed today have been drawn from experience in a field which has only a back-door acquaintance with medicine. I hope they prompt more soundly based ideas, and I thank you for your patience with an "outsider."

RESEARCH ORIENTATION AND METHODS

CONTRIBUTION TO EDUCATIONAL OBJECTIVES OF THE BASIC MEDICAL SCIENCES

William N. Hubbard Jr., M.D., New York

At the outset, it is important to emphasize that the contribution of a research orientation to achieving the educational objectives of the basic medical sciences is no different in principle than the person's ultimate responsibility for his continuing self-education in his profession. Although the basic medical sciences present both specialized problems and particular opportunities that relate to research, they should be considered as specific examples of general problems rather than being set aside in a separate category.

Teaching Objectives

Over a three-year period, the Teaching Institutes of the Association of American Medical Colleges considered the teaching of the departments of the basic medical sciences. In each of these years efforts were made to specify the objectives which these departments set for themselves. A refreshing lack of unanimity was apparent, but it is possible to categorize two broad objectives which seem common to all of the departments. The first of these is to prepare students for the practice of medicine and the second to recruit from the student body the few students who will be the teach-

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Associate Dean, New York University College of Medicine.

Read before the 55th Annual Congress on Medical Education and Licensure, Chicago, Feb. 9, 1959.

ers and investigators in the medical sciences in the future. These broad objectives have undoubtedly been stable for many decades and will continue to be so in the future. However, with the extraordinary changes that are taking place in the practice of medicine and with the tremendous growth of opportunities for teaching and research in the basic medical sciences, those concerned with the educational environment offered by the medical faculty have been reconsidering their traditional approaches to achieving their goals.

As recently as 25 years ago, only a handful of the medical faculties in the United States provided, in the basic medical sciences, an opportunity for more than a passive participation of the student in a series of didactic exercises and laboratory manipulations. The latter were commonly carried out from a detailed recipe book with the quality of the effort being judged largely by its conformity to a predictable outcome. In subsequent years there has been an exponential increase in knowledge pertinent to medicine, arising largely from research initiated in the areas of the basic medical sciences. The volume of important information is now so large that it is a manifest impossibility to present it in a comprehensive didactic fashion in the time allotted. As a result, an increasing degree of selectivity has to be exercised by teachers in choosing the material which they will present. The rapidity with which new information develops has now made it quite obvious that it is at least as important for the student to understand the process by which scientific data are reevaluated and accumulated as to master the momentary common store of knowledge.

Opportunities for the student to experience the pleasures of creative work that are inherent in seeking out scientific understanding can be more readily provided when he works independently in an area of his own interest and responsibility. This is a central educational role of research. For all students of medicine, then, these principles of instruction are the same: they must learn, against a background of common knowledge, to use their own senses in collecting enough pertinent data about a problem so that a rational hypothesis may be constructed and a soundly conceived effort taken toward the solution of that problem. To visualize and to solve problems—no two of which are precisely alike in biological systems—is equally the concern of the family physician and the research scientist. Both must have learned habits of critical inquiry and continuing scholarship that will allow them to remain creative members of a learned profession rather than simply practitioners, albeit skillful ones, of a vocation. They must be critical of their own judgment and decisions, discerning about the validity of what they read, skeptical of final conclusions, and anxiously concerned about the individuality of the problems to be solved. In short, they must learn to be scientific physicians, whether their work is at the bedside or in the laboratory. The setting in which these goals can be accomplished is compounded of students of excellence and faculty of distinction working in an atmosphere of scientific inquiry, critical self-appraisal, and independent scholarship. The intellectual discipline of accurate observation, logical deduction, adequate verification, and final generalization is the common goal.

Student Participation

The active participation of the student and his developing sense of individual responsibility for his own work are requisites of success in achieving the objectives of education in the basic medical sciences. The student must therefore assume responsibility in using the opportunities afforded by the faculty for self-development. Cardinal Newman in his lectures on "The Idea of a University" has emphasized that 'this kind of cultivation of the intellect is in itself an appropriate goal, just as the tending of the body with a simple view to its general health is acceptable. On the other hand, as general health is fruitful only as it precedes useful labor, so the trained intellect in its chosen field of special competence is fruitful by being able to think and reason, to compare and discriminate, to analyze with refined taste, and to formulate general judgments.

The zest for individual excellence is difficult to acquire under any circumstances but almost impossible where the student is bound to conformity to a too rigid curriculum. The quality of rational, informed skepticism which Santayana has called the "chastity of the intellect" is a natural outgrowth of efforts to pursue rigorously one's own interests in the sciences. Whitehead has suggested that the most austere of all mental qualities—a sense for style—can be recognized by the enthusiasm of attainment coupled with the discipline of restraint. The capacity of a person to love a subject for itself is the manifestation of achievement of style in that area. This almost moral sense of the intellect is the product of specialized study, and it is the exclusive privilege of the expert. The pride of craftsmanship that is developed is a continuing insurance of the maintenance of one's own individual standards of excellence.

Actually, the functions of transmittal of information and training in research techniques that are carried forward in medical schools could be performed at a cheaper rate separately from these expensive institutions. Books are cheap, and the system of apprenticeship is well understood. The justification for a university ideal is, as Whitehead has emphasized, in that it preserves the connection between knowledge and the zest for life. The university not only imparts information but imparts it imaginatively and critically. This quality of imagination is a contagious disease, to be disciplined by knowledge and the habit of scholarship to become responsible scientific inquiry. The development of a scientific style is therefore one of the particular contributions that research efforts can make in the education of future medical scientists. If a medical scientist is a scientifically trained physician, then there is no difference in this regard between good medical practitioners and good medical scientists; the more scientific the inquiry of the physician about his patient, the better practitioner he is. There need be no conflict between the art and the science of medicine, since noble behavior is not diluted by scientific knowledge and good practice depends on both of them.

Basic Medical Sciences

One of the most serious problems confronting medical education today is the decreasing number of physicians who are entering careers in the basic medical sciences. In spite of the rapid advances in certain areas of medical science in recent decades, the fact remains that medicine stands today only at the threshold of its development as one of the biological sciences. Unsolved problems of crucial importance concerning man and his diseases are still to be approached in all fields of medicine. Because of this, there is an increasingly urgent need for talented persons to take up careers of investigation and teaching in medicine. At the present time, the need is not being met. On the contrary, the number of medical school graduates in training for such careers seriously threatens, through shortage, the continuing progress of medicine. The spirit of adventure that is inherent in a search for understanding must be made available to the student if he is to sense the satisfactions of an academic career. Through participation in research activities he can personalize the growth of knowledge rather than look on it as some extraneous phenomenon. By participating in research he learns at first hand the importance of biological variation. He acquires an ability to deal rationally with variables in terms of mathematical probability. Simultaneously, he learns of the ever-present opportunities for improved understanding.

It seems quite clear that if a student learns from the basic medical sciences only the facts and skills that are preselected for him by the organization of the curriculum there is little motivation for him to consider a career in the basic medical sciences or, for that matter, to acquire the scientific style which could later distinguish him as a clinician. It has therefore become useful to provide a degree of flexibility in the medical curriculum and to give an opportunity for independent study and research training in areas of the students' own interests, in addition to maintaining the highest standards that insure a student to be fit for these independent intellectual enterprises. As Dr. Vernon Lippard has written of the program at Yale University, it is fundamental in the concept that the student is a mature individual, that he is strongly motivated to learn, and that he requires guidance and stimulation rather than compulsion or competition for a relative class standing. Equally basic is the concept that if a student is given unusual privileges he must assume more than usual responsibility for his education. Although these views were expressed in reference to the medical student, they could apply with equal emphasis to the mature clinician and the investigator.

Specific Research Program

In the past decade many medical faculties have increased their emphasis on research, following the lead of those in which the emphasis on research is traditional. The presence of active research efforts by the faculty has provided the opportunity for experience in research increasingly enjoyed by medical students. Rather than attempt a summary of programs in student research, let me describe the outline in a single school, emphasizing that it is cited as an example of convenience rather than implying that the opportunities are unique.

I refer to the New York University College of Medicine. For a few selected college students interested in research, summer laboratory experience at the medical school is provided. Generally, these are talented students who have not fully decided on their careers and who may be attracted to medicine by becoming more familiar with its foundations. Similarly, the summer is a time when large numbers of students in the four years of medical school undertake independent work. The student is required to prepare a short research protocol and have it endorsed by his potential sponsor, who is a senior investigator. The applications are reviewed by a faculty group and modest stipends awarded on the basis of merit. For those few students who have undertaken significant problems in research and who are seriously interested in an academic career, a fellowship year in full-time research is provided. The merit of the candidates determines the number offered, but it is small.

Throughout the first two years the students may elect to participate in an honors program. This consists of a series of weekly lectures and related seminars given on Saturday mornings. The speakers are persons distinguished for their research activities in biology and biochemistry related to medicine. There are also journal clubs for students, with an elected faculty preceptor, that meet twice a month in the evening. Faculty research advisors are also available to help the student initiate his own independent work. Since this program is voluntary and extracurricular and since its work demands are rigorous, the self-selection by students is striking.

In the first year—at the completion of the regular anatomy course—a special series of lecture and laboratory periods are devoted to current research approaches in anatomy. Electron microscopy, cytochemistry, tissue culture, and histochemistry are included. Similarly, in biochemistry a special series is given after a condensed basic course has been presented. This group of lectures and laboratory exercises introduces in some detail problems of protein characterization, enzyme chemistry and nucleoprotein metabolism. In pathology there are about a dozen two-hour periods where students in very small groups have demonstration-seminars in the laboratories of the individual investigators in the department. Here they see and handle the actual "bench work" as well as being able to discuss the problems with the investigator.

In the fourth year, there is a four-month block of elective time, which, with preceding vacation periods, can be extended to seven or eight months, when the student may pursue uninterrupted research without omitting any of the regular curriculum. By use of all vacation and elective time, 11 calendar months of research may be included in the four calendar years of the curriculum. This allows for that most important phase of encouragement of youthful imagination without demanding a premature commitment to a career in either practice or academic medicine. The particular role of research in the basic medical sciences is, then, an essential part of the development of the medical scientist, whether he be scientific practitioner or scientific investigator.

550 First Ave. (16).

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CONTRIBUTION OF RESEARCH ORIENTATION AND METHODS TO EDUCATIONAL OBJECTIVES OF CLINICAL SCIENCES

Nathan A. Womack, M.D., Chapel Hill, N. C.

Most students enter medical school with an idealism often not expressed but directed toward human service. With this is also frequently coupled a deep-seated curiosity as to the nature of biological phenomena and an intent, in some vague way, to elucidate them further. The humane idealism needs to be fostered certainly, and this is not difficult. A critical curiosity, however, is not at all easy to direct; nevertheless, unless we can direct the ordinary student into the development of a critical frame of mind, this curiosity will atrophy and the progress of medicine will be slow indeed.

I thus find this topic that I have been invited to discuss an intriguing one—this relationship between experimental methods and the development of the physician—for it introduces a possible way of encouraging this curiosity. It would hardly have been feasible, even a few years ago, to consider giving time to the problem of research and the experimental laboratory in the clinical years of undergraduate education. Just a short while back the experimental laboratory was not for the student who was a sound clinician but rather for the student who often showed a lack of the practical yet was able to make excellent grades in his subjects. To serve as a laboratory assistant to an able investigator in the preclinical sciences was often sought for, it is true, but equally as often the stipend rather than the intellectual opportunity was a very strong motive.

For the student who was to be a good clinician, the experimental laboratory was considered by some actually to be a detriment, since it tended to warp clinical judgment. In such an environment one saw the problem as it concerned an experimental animal or as it existed in the chemical laboratory, not as it manifested itself at the bedside.

We find ourselves now concerned with the wisdom of acquainting the undergraduate student with the experimental laboratory and in this consideration with the undergraduate during his third and fourth years of medical school education—just those periods in which most schools provide their teaching in clinical medicine. We who for some time now have made a fetish of bedside teaching are actually suggesting that this be diluted with a participation by the student in experimental medicine, or at least an understanding of the methodology of experimental medicine, for a dilution will be necessary. We cannot just add such an experience to the curriculum, for there is no longer any extra time in the curriculum. We naturally view such radical change with suspicion.

Bedside Teaching

We have lived with the philosophy of bedside teaching for so long now that its very concept has become sacrosanct. It is true that years back, when

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From the Department of Surgery, University of North Carolina School of Medicine, and the North Carolina Memorial Hospital.

Read before the 55th Annual Congress on Medical Education and Licensure, Chicago, Feb. 9, 1959.

this form of pedagogy was establishing itself, it had its own troubles in superseding the lecture. Many times the concept of bedside teaching was taken perhaps too literally, and groups of 20 or 30 students were distributed around a patient's bed while the teacher percussed the dimensions of the heart of his patient or tried to demonstrate a soft presystolic murmur to an unappreciative audience. "Old Shifting Dulness" he was called, and he taught clinical medicine in many a hospital ward, a sort of Mr. Chips, completely unequipped to stand the onslaught that was to come from the clinical laboratory and its effect on patient care.

At other times, though, this Mr. Chips was an able clinician and an inspired teacher, who would listen to the clinical history given by the student, make a brief and accurate examination of the patient, and then present a clear and logical analysis of the events that were transpiring within the patient. Observation was often so accurate and so complete that the deductive method needed hardly to be brought into play. At other times, objective manifestations were scant and here deduction played a more important role. Occasionally the student saw a rebellious mind at play—one unwilling to accept a relationship between phenomena as causative, when that acceptance often had become honored by time and usage. With the good teacher always the student found a thinking, logical mind capable of inquiry and also capable of directing that inquiry even though the methods used might be as simple as those of William Harvey. Most students tend to direct their interests and their methods of approach toward the solution of a problem in the same direction as does the teacher who affords them stimulation. This good teacher, then, in proportion to his abilities and to the time he found available for his teaching, performed well, because many of his students performed well. Many of us are thinking just now of men who fell into that category. Many of his students, however, not having the faculty of astute observation, relied more on deductions and assumptions, and the practice of medicine too often concerned itself with the recognition of clinical syndromes and an empirical therapy.

There were times when even this good teacher was unable to adjust to rapidly changing social and economic trends that were affecting his patient, the relation of the illness to the patient's family and to his community, and, again, the rapid progress made by the clinical laboratory. Change was necessary, and the change that has come, most of us will admit, has been an improvement. Perhaps, however, with a sense of nostalgia, we miss something that these men had to offer, for what they lacked in milliequivalents they compensated for in an ability to observe and to think. They were individuals and, as individuals, would not have been tolerant of group thinking and group research.

Decline in Clinical Observation

Why has the introduction of the widespread use of the clinical laboratory, with its more accurate tools, tended to reduce the form and effect of such brilliant clinical teachers in our faculties? Fundamentally, I think, the major effect has been on clinical observation. Clinical medicine could not become a science until its phenomena could be measured, could be quantitated. As an example may be cited the ability to determine the amount of sugar in the blood with the advent of the discovery of insulin and its use in the treatment of diabetes or the determination of the state of renal function by the measurement of the amount of certain substances in the blood plasma. There are many others, of course. Crude observations were not enough. To note that a patient presented pallor was inadequate in the understanding and treatment of anemia. Inspection, palpation, and auscultation were not thrown into discard, but the acuity of their use has been less evident since the introduction of laboratory methods. We may regret this, but at the same time I think we must recognize that it had to occur. Instruments more accurate than the eye and more subtle than the touch have necessarily taken the place of cruder methods of observation. Clinical observation then being less important became less accurate. The physical examination deteriorated until one now so often sees it on the hospital record existing as a jumble of unintelligible abbreviations.

As different tests began to be developed, the diagnostic tools were literally removed from the hands of the diagnostician and placed in the hands of technical assistants. The laboratory has not been free from pedagogic fault. Too often it seems the student now studies the diagnostic problems that his patient presents through the medium of a signed requisition. The radiologist on request will measure the size of the heart for him, and the cardiologist will present him not only with a picture of the rhythm but with one that will show the electric conductivity as it exists in various portions of the heart. He will even take a picture of the murmurs if any exist or measure the diameter of the mitral aperture if there is a degree of stenosis. The radiologist will diagnose for the student the nature and the extent of pulmonary disease with an accuracy often beyond that which the student or his teacher can obtain with the stethoscope, and this once ubiquitous tool of the internist now finds itself chiefly in the pocket of the surgeon, who notes its chief value in listening to the musical gurgles of gas as it fights its way downward through the recently traumatized intestinal tract. Even though a surgeon, I cannot but at times express regret at the lowly estate to which this once treasured instrument has fallen.

In the laboratory analysis of substances present in the blood, either naturally or from the use of certain functional tests, a new vernacular is developing. One now hears the expression "the patient's chemistries" were normal or a "spectrum" of liver function tests was performed, or the patient is now "in balance." It is not unusual to have many of these analyses made as a "routine" procedure. As such they require no discriminating thought. One merely needs to collect and appraise the results. I grant a modicum of exaggeration.

Such use of the laboratory has led to greater demands for diagnostic procedures to be performed, and this in turn has led to greater use of the specially trained technician. Too few students today know the vagaries of the techniques that are used in performing the tests that they demand, and no one now expects them to. More and more we move into a period in which the accuracy of diagnosis of a patient's disease rests in the hands of others than his physician.

Before I am accused of being too partial in directing attention toward the diagnostic methods learned in general medicine that tend to permit others to usurp diagnostic authority, let me add quickly that the surgeon is in no way different. An example is seen in his approach toward a patient with a lump in her breast. In most of the instances this patient finds the lump first. When she consults her surgeon, he does not even have to suspect cancer; she has done it for him. He places her in a hospital and removes the lesion in order to establish a diagnosis. It is true that a description of the physical characteristics is recorded on the clinical record, but the mass is destined for removal regardless of the diagnosis. Once the mass is excised, the surgeon may examine it if he wishes but the diagnosis is not official until a pathologist performs a frozen section and tells him the diagnosis. It makes no difference that most surgeons can recognize a cancer of the breast when they cut it out and look at it. The hospital must provide that pathologist's service, and a tissue committee sees that the surgeon uses it. As a result, morbid anatomy ceases to have as rigorous a position in the clinical years as it formerly did.

These tests have piled one on another until it is difficult at times to evaluate their meaning. There is no need to cite other instances. They are familiar to us all. We are equally familiar with the fact that the utilization of these procedures and the expert personnel required in their elaboration has also given us a diagnostic accuracy and a therapeutic achievement that has been thrilling to see unfold. We may wish to use these procedures more wisely and with more thought. We may object to the inspection by outside agencies who wish to make sure that we are using them. However, none of us would care to practice medicine very long without them.

Nevertheless, the ability to take an accurate history, to observe the physical appearance of the patient with utmost detail, and then to analyze the significance of this information is losing its acuity. In its place we are developing a mechanization of the art of diagnosis and a therapy by formula. We see an apparent lessening of the need for critical reasoning because of the utilization of an instrumentation often too complex for the student to master or, at times, even understand. We are thus confronted with the paradox of retaining and even continuing to expand the fine accomplishments of laboratory medicine and yet at the same time fostering in our student an attitude of observation, doubt, and inquiry that he formerly received from bedside observation and teaching. But this paradox can be solved, for many have done it.

Pedagogic Value of the Experimental Laboratory

Undoubtedly the best clinical teaching that we encounter or our wards today is coming from those men who have been able to relate the laboratory to the patient. It is because of this very fact, I think, that our subject today is important, for these men have one thing in common. Not only have they studied the sick individual with all of his numerous problems but they have been more than casual participants in understanding the analytical methods of the laboratory. They have asked questions and sought the answers by experimentation. To do this, the tools and tests of the laboratory have been only a means, not the ultimate goal. Why then would not this educational pattern of the good teacher be a good experience for the student? Would this not be a good way of solving the pedagogic dilemma in which we have found ourselves during the clinical years of undergraduate education? Perhaps yes, if it could be done well. This would make it possible to encourage the student to ask a question and then aid him in developing a methodology by which the question might be answered. Certainly the ability to ask and then to answer such a question will be an index of the maturity of the student's education. But will a period in the experimental laboratory really do this, and, if so, how can it be brought about?

Under consideration here is not the value of good clinical research but rather its value in helping to develop an inquiring mind in the average medical student. I doubt if such experience will develop much originality. It is conceivable that the student may bring to such a study original and well-thought-out ideas or that similar ideas may develop as he elaborates on a problem supplied him by someone else. Such will, as a general rule, be beyond the ability of the average junior or senior medical student. We shall not be considering, therefore, the idea of inserting into our clinical curriculum a brief period devoted to discovery, for the chances are that while originality would be cherished it could not be taught.

The value that such a discipline would have to offer then must relate to its methodology. This methodology is complex and, in accent, will vary from time to time. It is fundamentally concerned with imagination, reasoning, observation, and understanding, and these certainly are qualities we would like to develop in our students. It would be well, then, if our student entered this study with an academic background that allowed the free use of epistomological rules. So few of our students do, however. Most of them have spent far too much of their time before entering medical school in accumulating scientific facts or have taken their majors far afield—in music or in history. Desirable as this knowledge of formal logic may be, the lack of it should not pose an insuperable hurdle. Often the student who has had a preparatory background in the liberal arts will have adequate experience in the use of formal reasoning to understand the nature of the goal and the principles involved. This being true, the research problem will best be set up with student participation and not prepared in detail for him. Here the student will come face to face with the nature of research and the ability and character of his teacher.

By clinical research I am not concerned here with retrospective studies in the record room, such as the counting of the number of people who have survived for a period of five years or more after a particular therapy. I am also not thinking of the "case report with a review of the literature." Enough data of this sort have accumulated to satisfy even the dust of Francis Bacon. I am thinking of research as it applies to answering a question by a well-devised experiment. Such research has been described in many ways. I like a recent definition of Bernard Greenberg's, "a burning yearning for learning." If the first letter of the last word is omitted, one sees clearly the common motive for violation of the essence of research. Too often, research studies become the legal tender of academic life. There are deans and even faculty committees who use the number of papers published as an index for academic promotion. We teachers are critical of this; we even become cynical about it but, when asked to serve on a similar committee, find ourselves seriously considering the same unit of measurement. The annual departmental report is often mute testimony of that department's scientific interest and motives. The late Professor Robert Bensley made a point of insisting that it was of little importance who first did a piece of work or who was first to report it. The important thing was always "is it true." A student introduced into an atmosphere where something less prevails will be injured by the experience. Besides a good intellectual background then, he needs a teacher and a guide, for here he must see nothing but the best in scientific morality.

It is difficult to imagine a more valuable experience in self-criticism than that of designing an experiment under wise guidance that would give valid results regardless of their nature. In setting up an experiment, in determining the number of observations and the nature of the control, biostatistical methods are a necessity. Experimental design must follow fairly rigid rules, or else observations become untrustworthy or irrelevant. Often the recipient of jokes by the "practical" investigator, the biostatistician has been a patient soul. For a long time he was ignored by the clinical investigator, but, as evidence began to accumulate as to the use of formal statistical methods in the evaluation of data, a change in attitude began to take place. Many schools now even have a course given in biostatistics. This consists, as a rule, of only a few hours of instruction, it is true, and generally it is given in the preclinical years in order not to take time away from sound clinical experience. Perhaps eventually it will be taught in the clinical years and papers that have been published in some of our clinical journals given students for statistical analysis as exercises in critical judgment. If this were done, it undoubtedly would have a beneficent effect on certain editorial policies. It would have an equally good effect on medical education during the clinical years. There is probably no better critical experience than that of studying published clinical reports from this vantage point.

Having planned the experiment with the type of observations to be made, the student must now make these observations. It will be recalled that Claude Bernard felt that the observer must be unprejudiced and passive. Only when he becomes the experimenter is he allowed to be the active questioner of nature. Prejudicial observations have meant a fatal ending to many careers. Fortunately, we have reached a position today when it is a very simple thing to obtain such "passive" observations. Such is the value of electronic devices. Observations can be made speedily, accurately, and repetitively —provided that the proper instrument is used, that it is well calibrated, and that its mechanism is understood. It is of little value to measure "that which one knoweth not." It is essential, therefore, that the investigator be familiar with the instruments used in making his observations. He cannot safely rely on a technician to supply him with his data unless he can supervise the work of the technician. For the student to be placed on an experimental problem, so designed that the observations are complex and must be made by an expert employed with funds obtained from a project grant, may result in the answer to a question, but it will not be a good exercise in critical judgment. The type of experiment on which the student works must therefore have definite limitations. So many students, not being seasoned investigators, have what amounts to a saintly disregard for such detail in experimentation. They demand that they be allowed the privilege of great discovery. It is up to us to acquaint them in the beginning with the cost.

Besides being familiar with the design of his experiment and the instruments and techniques with which his observations are to be made, the student must also have a thorough knowledge of the background of his problem, of the work that others have done relating to it, and of the accuracy of their conclusions. He must have read, and read in such a way that he has explored, many collateral fields. He must know how to catalogue his reading, discarding the irrelevant and preserving the important. He must know how to record his observations so completely that no experiment need be repeated and that when his data are assembled a valid conclusion can be made. This will take time. It is not a job for odd moments.

These are rigorous rules that I have outlined, and intentionally so. A slovenly performance by the student in the experimental laboratory would defeat the very purpose for which the experience is being designed. For a student to work in a laboratory during the summer months with a stipend that is generous, on a problem that is vague and without adequate supervision, is not enough. The student must be taught in the experimental laboratory with a care equal to that with which he is taught on the wards. Just now there is a real shortage in clinical teachers who are familiar enough with the experimental laboratory to do the work well. Too many of our clinical teachers are products of a graduate curriculum specified for them by their specialty boards. Such an experience in research is no concern of a specialty board. Most schools have a few such men, however, and just now there seems to be a preponderance of these in departments of internal medicine. If the experiment is a limited one, a beginning can be made. Obviously, students would have to be selected carefully. Perhaps this is well, for at present few schools have entire classes in their clinical years that would be receptive to such an experience as being preferable to that spent in some clinical endeavor. Nothing could be more detrimental than to have a coercive approach.

A number of our schools are already proceeding with this curricular experience in spite of these obvious difficulties. Enthusiastic students with good minds are already coming under the tutelage of able clinical investigators during their summer months and during elective periods. The result seems to be well worthwhile. It is highly likely that the practice will gather momentum and that it in itself will make facilities more readily available. Needed will be able students and good teachers with available time, space, and equipment. Just now no school has enough of these, and therefore an evolutionary approach is mandatory. It promises to be a notable addition to the curriculum of our clinical years, but it cannot be brought about by simply assigning a block of time for research during this clinical period, as some have thought possible.

THE ROLE OF RESEARCH IN GRADUATE MEDICAL EDUCATION

James A. Campbell, M.D., Chicago

The increasing significance of the role of research in the education of all physicians is readily apparent, and the value of research in teaching the scientific method and extending its war against empiricism needs little further apology. Its usefulness in stimulating curiosity and evaluating data is true at any time in a physician's career—whether it be as student, graduate, or practitioner. What, then, are the questions to be raised concerning the proper place of research which are peculiar to graduate medical education? How is graduate medical education different from undergraduate medical instruction? Perhaps a set of answers to this latter question might help in part to answer the former.

Establishment of Research Orientation

"Undergraduate experience," according to Darley, "is aimed at developing the fundamental principles applicable to the whole body of medical knowledge, at establishing habits of reasoned and critical judgement of evidence and experience, and at developing the ability to use these principles and judgments wisely in solving problems of health and disease."[1] The graduate years are reserved for undertaking "to become as proficient as possible in the complete, detailed, systematic body of knowledge and in the techniques and the judgements required to excel in the one discipline of his [the student's] choice."

In the graduate years, then, it becomes evident that an intense effort to develop more and more independent patient responsibility is one of the primary components of the graduate experience and that an increase in the skills of applying knowledge becomes essential. The young graduate physician becomes more and more a "doer" as he continues his scholarly attitudes.

If it is felt by undergraduate instructors that the experimental method is one of the prime effectors of "establishing habits of reasoned and critical

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Professor of Medicine, University of Illinois College of Medicine, and Chairman, Department of Medicine, Presbyterian-St. Luke's Hospital.

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judgment of evidence," then it might well follow, as Dr. Vernon Lippard has described, that research would be an assignment and a requirement for receiving the M.D. degree without regard to whether the student was interested in or capable of creative effort. Since the undergraduate medical years are particularly formative ones, this concept may be valid. At any rate, those people who concern themselves with the programs of graduate medical education seem to me to have the right to expect that the undergraduate medical students come to them prepared for their graduate experience inculcated with the spirit of the scientific method and eager to apply it in increasingly independent action in planning and carrying out both diagnostic and therapeutic goals.

If this be true, then at the graduate level research should not be forced but merely fostered. This is an attitude which I would like to believe is not only conducive to good education but also helpful in producing better research. We must give graduate students in medicine, that is, house officers in their internships and residencies (since this obviously does not obtain with respect to research fellowships or the like), a chance to make a mistake of choice in this area as well as decision in the area of their clinical graduate training. They need and should have consultations, but they need to become more and more independent in medical development.

I think I agree with the statement of Lewis[2]: "There is no doubt of the value of research in the nurture of the critical mind; however, I think we are unrealistic if we fail to recognize that only a few have real aptitude and interest in investigation." Does it really seem profitable or logical for a young man who does not have that interest and aptitude to spend a year during which he functions intellectually not far above the level of a technician?

On the other hand, I do sincerely believe that research must be encouraged and that graduate medical educational programs must be geared to stimulate the participants either to continue or to initiate investigative programs of some nature relevant to their own discovery of a problem which warrants solving by first-hand contact with it during the course of their training. Also, research time must be planned for in the residency programs if a person elects to spend a significant period in this fashion. The replacement of the classic pyramidal pattern to the chief residency by the block type of structure has done a great deal to encourage the exploration of a given medical area through the use of a research discipline. It should be stated for completeness that not all students who may elect to try investigation as a method of continuing their education will achieve research results worth much to anyone other than the person who did the work, who, after all, is a most important person.

Research Methods

What are some of the opportunities whereby research methods may play a significant role in graduate education? First of all, the literal use of the word "research" may be exactly what some house officer needs to give him a new chart by which to sail. By this, of course, I mean emphasizing and reemphasizing the one fundamental investigative tool which is all too frequently underestimated, and that is a search of the literature. This is a firm building block of any investigation and it is also an equally important contributor in any continuing education, for it requires a well-developed and perhaps well-disciplined curiosity to be successful in either.

Two things are involved in searching the literature. First, it makes certain that the potential investigator is not merely satisfied to keep busy by working with his hands. Parkinson's[3] law holds for the laboratory as well as for the administrative office. The law in part states that work expands so as to fill the time available for its completion. Second, the investigator may find that his experiment has already been performed. This is doubly comforting on second if not on first thought. If the observations have previously been made, it has saved time and effort (unless he wants to confirm them) of performing the study and it requires critical evaluation of techniques, interpretation, and conclusions before accepting it. It also indicates that someone else thought enough of his idea to invest talent and energy in it, which may stimulate him further. However, it may take considerable introspection before this state is reached.

While the prosaic technique of reviewing the literature is being emphasized, I should like to point out that, obligingly, Castle[4] recently has mentioned the "case report" in a favorable light. He writes, "As with the modern clinical investigator, a hazard run by the busy physician is that he will forget the basic orientation value of his senses. Complex apparatus is not without its disadvantages to the mental activity of the clinical investigator; and without a clear history, a careful physical examination, and simple laboratory studies, the physician may also become lost in a wood in which he sees only the trees. Worse, he may lose the curiosity that urges him onward to a better understanding of disease and of his patients. This is the danger when the dizzy round of the immediate and the urgent becomes too pressing. Then is the occasion for time out for a refresher course or for the preparation of a case report with the help of the medical library where there is sanctuary and sustenance for the hard pressed mind."

This preservation of the curiosity by contemplation and study is an ancient process highly revered. "Curiosity," Castle says, "is an autocatalytic process. More facts come to the attention of the curious observer, and so more and often unexpected data accumulate to be contemplated in search of significant relations. Now, the most difficult problem in medical education is not how to become but how to remain educated in a rapidly changing scientific world. I can think of nothing more likely than intellectual curiosity to provide the necessary growth and development of the individual's knowledge and effectiveness."

A second approach to encourage the possibly non-research-oriented house officer to consider the role of research in his graduate education has been his exposure to research laboratory techniques which have been adopted as perhaps a relatively recent addition to the armamentariums of standard good practice. A rotation of a few months through a modern clinical cardiorespiratory laboratory may be sufficient to whet the appetite both for improved clinical acumen and for scholarship. The results of such contact are immediately apparent on the wards, and the increased number of cardiac research fellows attracted by this technique has been demonstrated amply throughout the United States. The primary proposition is not, however, how to get more research done, but how it may apply to the learning process at the graduate level.

In the same category is the so-called basic science laboratory assignment, usually in pathology, although more recently in biochemistry. This has long been tried as a stimulus for scholarship and, in turn, for an added dividend at the training level. Degree programs which have been developed with this used for a backdrop have been in successful operation for a number of years. Pruitt[5] reported on this to this Congress in 1956. One point which he emphasized quite properly was the production of a scholarly thesis as an indication of effective work, but he pointed out that, whereas the assignment to the laboratory was arbitrary, the exploration of the unknown was an optional derivative of the experience.

I would be remiss if I did not mention that, in any of the guises of introducing graduate students to the laboratory areas, it is apparent that they are being thrown into contact with men who usually have some inclination in the direction of research and without whose enthusiasm, instruction, and counsel the time spent in the laboratory would be similar to that spent as a house officer on a ward without a visiting physician.

If any of the various strategems have been successful in stimulating house officers to scholarship, it would seem valid to insist that an appropriate amount of free time be allowed during a residency for carrying out any soundly conceived research program. In this concept it is convenient to have men and facilities in one's own unit to support the research resident through a significant period. If this is not possible it still seems a wise expenditure of time and funds to attempt to find an opportunity elsewhere for such a person. At this point the secondary gains of such a venture to the staff and house officers would seem to justify this approach.

House Officer Education

There is one other possibility to consider: that in which a student has gone through the undergraduate medical curriculum, has definitely decided on a career in the fundamental sciences, and now is curious about what the role of house officer education is in basic research. I believe this type of experience is often as valuable to the productive career of a basic scientist as research experience is to a clinician. For one thing, I would encourage such a house officer to become actively engaged in some pure clinical research in which human beings must be studied with care, competence, and compassion —a study in which the patient's signing out two days early would "ruin" either the test or the control period. I would hope through this means not only to bring him into contact with new information and discovery but also to demonstrate that there is bad laboratory research as well as good and that there is good clinical research as well as bad. I would hope that he might learn that experiment in both clinical and laboratory research is perilous. One other thing which I would expect that he might learn in this period of graduate medical education is that "while planned experiments," as John P. Peters once suggested, "afford the advantages of voluntary control, the genius of man cannot yet compete with the capricious ingenuity of nature, which has performed upon patients experiments as yet beyond the technique of the physiologist. The science-for-science's-sake and the you-never-can-tell-where-it-will-lead philosophy can be overworked. If clinical investigators need to live down their somewhat shady past (as once was pointed out) laboratory investigators may need to live down their more pretentious present. The number of free-wheeling clinical investigators is probably not greater than the number of test-tube investigators 'becalmed in the doldrums of techniques and mechanisms.' The individuals of genius are perhaps as rare in one group as in the other."

The impact of investigators on house staff education and the participation in research may be profitable and exciting at any time in graduate medical training, and the close contact with patients and their problems can sober the most enthusiastic scientist with the thought of how much more there is for everyone to know and do.

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RESEARCH AND THE TEACHER OF MEDICINE

Isidore Snapper, M.D., Brooklyn, N. Y.

There can be no doubt that an effective teacher of medicine must be deeply interested in medical research. The faculties of the medical schools have understood this for many centuries. Every time one or more clinical chairs became vacant, the schools searched for new incumbents among physicians or surgeons who were (1) outstanding teachers, (2) experts in the clinical field they were going to teach, and (3) well-trained experimenters who had made contributions to the scientific aspects of their own fields of medicine. In different schools different degrees of emphasis have been placed on these three requirements, and in certain medical schools the trustees and overseers may have been too interested in whether the professor or the associate professors taught sufficiently and efficiently. In modern times it seems as if this emphasis has changed. In many areas interest in discoveries in medical research has taken the place of interest in efficient teaching.

The teacher of medicine must be well versed in research methods and in the scientific approach to clinical problems because the medical student of today will probably still practice medicine in the year 2000 A. D. This means that our medical schools must provide education which will cover not only the year of graduation but also the four following decades.

Through the ages the progress of medicine has always been rapid, and it can safely be predicted that the knowledge of today will be old-fashioned and even obsolete in 40 years. Many of our contemporaries feel that this historically well-tested experience is not valid anymore. They contend that in our times the progress of medicine has been so much faster and so much more fundamental than in any other comparable period that our knowledge of today is here to stay. However, for many centuries the medical scientists have cherished this erroneous concept.

Every generation of physicians has assumed that at last the stone of the philosophers, the arcanum, the panacea, has been discovered. Boerhaave, Benjamin Rush, Charcot, Osler, and many others extolled the world-shaking and revolutionary innovations which during their lifetimes had—in their eyes—fundamentally changed the aspect of medical science. William Osler wrote in 1902: "Never has the outlook for the profession been brighter. Everywhere, the physician is better trained and better equipped than he was 25 years ago. Disease is understood more thoroughly, studied more carefully and treated more skillfully. . . . Diseases familiar to our fathers and our grandfathers have disappeared, the death rate from others is falling to the vanishing point and the public health measures have lessened the sorrows and brightened the lives of millions."

The most enthusiastic medical neophyte could not sing the praise of 1959 in words more exalted than those Osler used in 1902. To Osler the progress of medicine in 1902 appeared just as revolutionary as the new developments in medicine appear to us today. It seems hardly possible that medicine is shaken only occasionally by revolutions, and there is no doubt that our knowledge of today will appear in the year 2000 as the medicine of Osler's time appears to us today.

The graduates of 1959 will only be well prepared for the medicine of the year 2000 if during their training in the medical school basic medical concepts are kept in the foreground. Since in our American medical colleges experimental medicine and the explanation of the pathogenesis of medical symptoms and signs are emphasized, we can be satisfied that our students are well qualified to understand new aspects of medicine which are bound to be developed in the future.

At the same time, medical education must also provide thorough training in the medicine of today. The fact that the problem of research and the teacher of medicine has been chosen as a topic for today seems to indicate that qualms are being felt about the effectiveness of certain aspects of our teaching. In other words, we have gathered here today to find fault with ourselves in order to strengthen our education by correcting our weaknesses.

Vulnerable Spots in the Educational System

Actually, the opinion has been voiced that two potentially vulnerable spots may have developed in our medical educational system. The ensuing damage, I hastily add, is, as the final analysis will reveal, well compensated, and the ultimate outcome will remain highly satisfactory if a few reorganizations can be decided on.

First, the dangers of overemphasis on research in medical education should not be underestimated, even if untold advantages accrue to the teacher in medicine who is also interested in and occupied with research. Clinical medicine can be defined as the application of medical knowledge to the diagnostic, therapeutic, prognostic, and sociological

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Director of Medicine and Medical Education, Beth-El Hospital.

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problems of one special patient or of a group of patients. In the estimation of most of the experienced diagnosticians I consulted, more than 75% of the knowledge which a good clinician must at all times have at the tips of his fingers is purely empirical. A few examples may suffice: the leukopenia in typhoid, the thrombopenia in relapsing fever, the dorsal flexion of the big toe in the presence or damage to the pyramidal tract, Kussmaul's breathing in diabetic ketosis, the localization of the tuberculous meningitis at the base and of the meningitis caused by Neisseria meningitidis and that caused by Diplococcus pneumoniae at the convexity of the brain, the peracute start and the acute crisis in lobar pneumonia, the prevalence of influenza bacilli in bronchiectasis, the tendency of bronchial tumors to metastasize to the brain, the predisposition of the adrenals as the site of metastasis of certain malignant tumors, the development of clubbing of fingers in ulcerative colitis, subacute endocarditis, and other diseases, the early destruction of the intervertebral disks in inflammatory diseases of the spine in contrast to the conservation of the disk in metastatic vertebral destruction, and the preference of gout to attack the metatarsophalangeal joint of the foot. These are merely an infinitesimal fraction of the innumerable number of facts of great clinical importance which have to be learned by rote because until now all efforts to find a satisfactory explanation have failed.

Although the progress of medicine will mainly depend on research and experimentation, the fact remains that 75% of the knowledge of the clinicians can only be acquired by humble empirical observations at the bedside under the guidance of experienced clinicians. This part of medical education may suffer in certain schools where the departments of medicine are directed by full-time scientists who largely believe in "reduction in the degree of empiricism" and consequently have only scant interest in empirical medical knowledge without which the clinician cannot do his work.

Second, the short curriculum in American medical schools is also a reason for concern. In 1917, the curriculum lasted for four years, although in most European countries medical education was extended to a period of six to eight years. Now, more than 40 years later, in spite of the tremendous expansion of medical knowledge, our curriculum is still limited to four years. It seems to be generally accepted that even today this four-year curriculum is just as sufficient as it was in 1917 because our future medical students receive careful premedical training during the three to four years of their college education. This argument is not valid.

Today there is general agreement that, with a few exceptions, the training in the high schools of the United States is insufficient for future university students. For all practical purposes the three to four years in college only enable the medical students to obtain the knowledge which they should have obtained in a high school of good standing. In other words, the college training must fill the vacuum which is produced by the unsatisfactory high schools. Recently, under the shocking impact of international political developments, statements and reports have been made public that condemn the condition of our high schools.

Let us not fool ourselves by thinking wishfully that the excellent reports of the numerous committees which study this situation will improve our high schools. The Flexner report had its impact on the sorry condition of our medical schools only because the Rockefeller Foundation and comparable foundations were willing to implement Flexner's proposals with staggering donations to private medical schools. The ensuing tremendous improvement of the majority of the private medical colleges then obliged the state medical schools to follow.

Since the number of private high schools is insignificant and public high schools cannot be changed by donations from private foundations, there is little hope that in the near future our high schools will change for the better. For a long time the vacuum represented by the high school will remain a heavy drag on medical education and will, mainly for economic reasons, prevent any extension of the medical school curriculum. Therefore, the three to four years of college training will have to stay with us, and modifications of the teaching programs in the college years will not be able fundamentally to reduce the damaging influence of the high school period.

Careful analysis of these two potentially vulnerable spots seems to indicate that the brevity of the curriculum and the overemphasis on the experimental medical science are closely connected. Moreover, thanks to a remarkable equilibration, the combined influence of these two apparent disadvantages has actually been favorable.

Medical School Curriculum

The training in medicine, surgery, obstetrics, and other fields that the American student receives during the two last years of his medical school curriculum is mainly in the hands of young instructors and assistant professors whose medicine is of very recent vintage. Participation in the active teaching of the third-year and fourth-year classes by experienced clinically oriented members of the faculty is limited to a relatively small part of the schools. The majority of the interviews of freshman-interns reveals that in many of the medical schools the lion's share of the clinical bedside training had been entrusted to the young teachers.

The latter, influenced and indoctrinated by the chiefs of their department, are vividly interested in theoretical medical research and have a healthy contempt for empirical medicine which cannot as yet be investigated by experimental methods. This is eloquently described by one of our most erudite academic teachers in the following words: "The atmosphere is experimental, the mood inquiring, the goal is understanding. The oft repeated aphorisms of the great clinicians are supplanted by information quoted from a variety of scientific journals."

Although the material taught during these years is far remote from clinical medicine, due to the active student participation, it is, nevertheless, of paramount importance. This two-year course in experimental physiology applied to patients is unique in the world and teaches the student to integrate physiological knowledge into clinical medicine. Thanks to this excellent preparation, the American physician, for the rest of his life, will always try to apply physiological principles to the understanding of disease. This knowledge proves to be a solid foundation for the clinical training at the bedside which, however, must be provided after the graduation, during the internship and residency years.

Since the two-year course of applied physiology at the bedside is an all important preparation for the post-medical-school training of our graduates, the last two years of the actual curriculum should be kept inviolate and intact. The few medical schools which permit their fourth-year students to work as junior interns—actually as interns—in hospitals, make a grave error. The favorable results of our medical schools are only possible because our institutions do not even try anymore to reach for the impossible, that is, to provide, in a period of four years, training both in basic theoretical medical fields and in applied clinical medicine. In this way the lack of emphasis on Hippocratic training in medical school, which at first view might impress as a weakness, ultimately proves to be the strength of our medical education.

This is only possible because, with true American know-how, we have enlarged our four-year medical school curriculum to a seven-to-eight-year medical training program by adding a mandatory internship and a nearly mandatory two to three years of residency. During the latter three to four years, true clinical medicine must be taught to our excellently prepared graduates; in other words, during this period the large part of medical knowledge which is empirical in nature must be put in the foreground. Although every opportunity must be sought to continue the indoctrination of the members of the house staff with the importance of results of experimental medicine, the latter cannot be placed in the center of the post-medical-school house staff training.

Hospital Educational Program

It is deeply regrettable that the greater number of the voluntary hospitals to which the teaching of clinical medicine during the internships and residencies has been entrusted have not succeeded in offering an attractive and effective educational program. "To follow a hospital-attendant through the wards and see what he does in his daily routine . . . is not medical education," Ewing wrote in 1916, and no truer words were ever written.

The small fraction of the numerous hospitals recognized for intern training which are actually chosen by the young graduates can be found in the small booklet containing the results of the National Intern Matching Program, issued every year on March 1. These figures clearly illustrate how few voluntary hospitals offer adequate teaching programs.

Personally, I have great respect and admiration for our budding graduates who do not succumb to the enticement of large monthly stipends, royal intern quarters, and lavish promises which can be summarized as "cows with gilded horns." Many of our future interns have only modest means and are, at the same time, burdened by heavy financial and matrimonial obligations. Nevertheless, they clearly prefer the hospitals which offer primarily a well-integrated teaching program but an inadequate financial reward and shun the hospitals where they will be abused as scribblers of medical charts, although higher emoluments and valuable fringe benefits are offered.

Many of the voluntary hospitals have understood that this unfortunate state of affairs could only be improved by organizing a plan of education for the young physicians who serve as interns or residents. For this purpose, in many voluntary hospitals a director of medical education has been appointed who must provide more systematic teaching both by lectures and by better organized ward rounds.

It has been brought out at previous sessions of this congress that the success of these well-meant efforts has been practically nonexistent as far as the recruitment of interns is concerned. It seems to me that the following point should be kept in mind.

Pure clinicians, mainly interested in empirical medicine, are often poor teachers. In this connection it must be emphasized that the approach to the diagnostic problem of a patient is exactly the same as the approach to a research problem—irrespective of the difference in the tools which are used in the attack on the problems. Only clinician-scientists who have been accustomed to tackle the difficulties of research problems know how to attack systematically the clinical problems which must be solved to find a satisfactory answer to diagnostic and therapeutic questions. Whether knowledge obtained by experimental methods or empirical knowledge obtained by observation and experience is used, the methodology which must be employed to tackle the problem remains the same. Thus, the pure Hippocratic clinician without interest in scientific research is usually an inefficient teacher, even of empirical medicine.

It would seem that the appointment of a clinical scientist as a director of medical education could considerably improve the educational programs of the voluntary hospitals. However, at all times it must be remembered that education can never be better than the teacher. Therefore, the director of medical education should not be a coordinator alone. Only if the clinician-scientist who directs the medical education is willing to do most of the teaching himself will the hospitals profit from the appointment of such an incumbent. In addition, he must organize weekly medicosurgical rounds, x-ray conferences, grand rounds and clinical pathological conferences, and other combined sessions so that his educational influence does not remain isolated to medicine alone but also reaches surgery and other departments.

In this connection it may be mentioned that in the history of American medicine the dynamic influence of the clinician-scientists on the progress of medicine has often made itself felt. When, thanks to the report of Abraham Flexner, a new era for medical education started in the United States, the newly appointed chiefs of departments were, of necessity, physicians and surgeons who had already made their reputation in clinical medicine and who, at the same time, had made contributions to the science of medicine. These clinician-scientists in their role as chiefs of departments made American medicine famous over the world and completely reversed the current of students which at the time ran from America to Europe. It seems possible that clinician-scientists might also be able to spark the teaching of medicine in the voluntary hospitals and attract American graduates as house staff members.

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Summary

Thanks to the training and interest in research of the teachers in the medical schools, our medical graduates are well prepared for the progressive development of medicine which is bound to occur during their active medical life. In addition, they have the potentiality to develop into excellent clinicians during the post-medical-school years of house staff training. In the medical school hospitals the house staff training is highly satisfactory as long as the staff members who are clinician-scientists remain leaders in the bedside education.

The voluntary hospitals will only play a role in post-medical-school training if they put one or more clinician-scientists at the head of their educational programs. It follows that not only for the teachers in the undergraduate medical schools but also for the physicians responsible for the post-medical-school graduate training—both in university hospitals and in voluntary institutions—active interest and participation in research are mandatory requirements.

The teachers who are charged with the training of young medical graduates must be clinician-scientists, i. e., they must have, apart from their scientific orientation, a healthful respect for that part of medicine which is empirical in nature and is based on experience.

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RESEARCH ORIENTATION AND THE PRACTITIONER OF MEDICINE

Warde B. Allan, M.D., Baltimore

The research orientation and the practitioner of medicine is a subject that defies easy analysis and ready solution. The impact of research on the practitioner is just as important as the impact of research on the patient. As a matter of fact, the end-result is much the same. The practitioner is expected to filter out the good from the bad and recognize the practical applications of the results of these studies. The research physician should be in a position to disseminate practical and useful information to the practicing physician. On the other hand, the practitioner of medicine is in a situation where he, too, may do investigative work. I always think of that classic example in this regard, namely, Sir James Mackenzie's contribution regarding "Extrasystoles." After many years in practice and observing many instances of this disorder, he gave a most lucid analysis of the clinical significance of this type of cardiac arrhythmia. In the United States the historic work of William Beaumont and his famous patient, Alexis St. Martin, demonstrates what can be done when a situation arises that lends itself to clear thinking and patient application.

Patients are critical of the passing of the family physician and even suggest that socialized medicine is the answer. That is disturbing. Yet these same patients feel that "health" is a birthright and they should have access to all the latest achievements in diagnosis and therapy. These patients place an additional burden on the physicians. Not only must they be the "family doctor" but they expect them to keep up with all the sensational information so vividly described in the lay press.

Relationship of Research and Practice

Perhaps this change has occurred because of the influence of the "ivory tower doctors" on medical teaching. Perhaps medical schools are making stereotyped individuals out of medical students and suppressing intellectual curiosity. No doubt this has happened and is happening, but the recent trend in medical training in many institutions is in the direction of stimulating intellectual curiosity. If this training is more widespread and more young physicians develop this attitude, "research" or observation of the onset, course, and result of any given disease process might be better understood and, by the same analogy, better treated. As a result, the patient will benefit. It should be reemphasized that teachers of medicine should inculcate an attitude of thoughtful curiosity in the minds of medical students. The problems of diagnostic examination as well as the special problems that arise under these circumstances should be carefully analyzed. Available information referrable to these problems should be thoughtfully studied. The systematic pursuit and accurate documentation of the problems will make students better clinical observers and more appreciative of the research projects that are being done in these fields. It will eventually bring the practitioner of medicine and the research physician closer together.

Sir James Mackenzie pointed out better than anyone the opportunity for research in medical practice when he wrote: "Consider for a moment who is the individual in medicine who has the opportunity of seeing all parts of medical science in its true perspective. It is the general practitioner (i. e., the practitioner of medicine). He sees the conditions that predispose to disease; he sees its inception and the course it pursues, passing from the signs for medical treatment to the time when it calls for surgical interference. He sees the after-effects of the operation after the surgeon has claimed it as a success. If he is stimulated to inquire into the symptoms of the disease, he is brought in contact with every special department, and has the opportunity for estimating them at their true value."

What was true in Mackenzie's time is still true in our time. The practitioner of medicine is the backbone of medicine today. Though the field of each practicing physician is, in a sense, restricted, the horizons of adventure and observation are without limit. The practicing physician has a magnificent opportunity and duty to observe patients in this fashion and even add to the fundamentals of our knowledge of disease.

This is truly "research" of just as much importance as that of the laboratory worker, where modern buildings and elaborate apparatus seem to count for so much. When a physician runs into a perplexing problem in medicine, he should endeavor to spend some time in "investigating" that problem. Some of this information may be fundamental and worthy of publication. Indeed, it should be in the literature to help others. This is "fundamental research."

Associate Professor of Medicine, Johns Hopkins University School of Medicine, and member, Council on Medical Education and Hospitals, American Medical Association.

Read before the 55th Annual Congress on Medical Education and Licensure, Chicago, Feb. 9, 1959.

To carry this a bit further, such research should be a great boon to the practitioner of medicine when he is faced with a complicated problem in one of his patients. His experience and documentation of that experience in his own office files is far more helpful than the textbook. They will be disappointed because there are few, if any, textbook cases in medicine anymore. Each physician's records should, if carefully kept, be a source of tremendous information and most helpful in meeting that physician's current problems.

Most practitioners of medicine are keenly aware of the importance of thoughtfully conceived and properly directed research. By the same token, they are greatly bothered by the enormous expenditures for so-called research. There is some justification for this worry when one considers the figures for medical research before and after World War II and 10 years later. In 1940, 45 million dollars was spent on research. Three million dollars came from government, 37 million from industry and philanthrophy, and 5 million from endowment. In 1947, 88 million dollars was spent on medical research—28 million from the government and 60 million from other sources. In 1957, 330 million dollars was spent (over half of this went to universities and medical schools); 186 million dollars was provided by government funds, 90 million by industry, and 35 million by philanthropy. It is only fair to add that both these latter figures are larger according to more recent surveys. Mr. Francis Boyer, chairman of the board of Smith Kline & French Laboratories, stated in an editorial in *Science* in August, 1958, that "a productive medical research program requires not only a lot of money but considerable wisdom in its spending."

It has been voiced that there is not adequate screening of the research programs that obtain funds from government sources. This is not entirely true. Yet, there are loopholes that are recognized. This is set forth in the final report of the consultants quoted in "Advancement of Medical Research and Education Through the Department of Health, Education, and Welfare," published in June, 1958; two of the conclusions were that "the system of national advisory councils and study sections be retained and expanded as required" and that "base grants for research and training be distributed on the basis of professional judgments of the unique capacities and needs of each institution, and not made to finance specific projects or programs."

In spite of the increasing "watch-dog" attitude toward research funds, many practitioners of medicine feel that Charles Pinckney's adage of "millions for diagnosis and not a cent for treatment" might well be paraphrased to "millions for research and not a cent for service." The schism between the research physician and the practicing physician is a real one and must be approached with some sense of reality.

Much has been made of having more medical schools and more medical students. This is reflected in a statement made by Surgeon General Burney: "Unless construction funds become available on a much larger scale than has heretofore been contemplated, the output of physicians will not keep pace with population growth and the needs of the nation for research workers will not be met." When one thinks about this statement, it is apparent that Burney feels that the roles of the practitioner of medicine and the research physician are inseparable. What is good for one benefits the other. Research should always be regarded as one of the activities of a teaching hospital and, perhaps, some of the better-equipped nonteaching hospitals. Though research is so regarded, much of the fundamental work is done in the laboratories of the "pure sciences." Research should be an important part of any hospital in that the unique training along these lines develops critical judgment. Even a superficial exposure to research is important. No earth-shaking discoveries may be made, but that experience makes the practicing physician appreciative of the painstaking and slow, or even relaxed, effort of the research physician.

Only a few, and I may add very few, physicians are equipped intellectually to do research. Many physicians are taking part in research programs that are nothing more than proving or disproving something already known. This is probably important, but there have been few striking fundamental discoveries when one considers the over-all number of projects going at the present time. I would be the last one to suggest that all these projects be curtailed or drastically limited. After all, something fundamental may come from a project of the utmost simplicity.

Dissemination of Knowledge

The research worker should not scorn the practitioner of medicine because he is not laboratory oriented. All of us cannot be. The practicing physician, if he is conscientious, can be of the most tremendous aid to the research physician by applying of principles discovered in the laboratory. It is the duty of the research physician to recognize this fundamental fact. The research physician and the practicing physician must work together. The one complements the other. The results of investigation must be properly disseminated among the practicing physicians to be appropriately applied to the care of the patient for whom it was originally planned.

That raises an almost insurmountable obstacle. Should this be done at medical meetings? Should it be introduced by having the results appear in the medical literature? Or should this information be spread far and wide through the drug house contact man and advertisement?

The obvious difficulties of accomplishing this by medical meetings hardly merits comment. Granted, the number of medical meetings is increasing in an amazing fashion. The various specialties and subspecialties plus numerous general groups have annual meetings and regional meetings. This outlet for information would seem sufficient. However, the number of practicing physicians reached is surprisingly small, forming but a minimal segment of all physicians. The medium of meetings leaves something to be desired because the information cannot be studied with care. I am sure that all of us have heard the results of superb investigation at a meeting but are unable to recount this information with any degree of accuracy. Meetings do serve their purpose in a limited way but are not the complete answer.

It is unfortunate that there is such a profusion of medical journals. No one practicing physician could possibly read all the journals; that would be a full-time job, even a life-time job. It is unfortunate, also, that so many articles appear for other reasons than to convey worthwhile information to the medical profession at large.

It is obvious that the results of research should not be given over to lay people. Yet this is happening in an ever-increasing way. It is astonishing that so much has been left to the pharmaceutical houses. This information is placed before the profession by a phenomenal advertising program that appears in many, but not all, medical journals. It is often presented in a more striking and eye-catching way than the text of these journals. Remarkable claims are made that are frequently misleading and lead to the masking of disease processes that would not happen if the medical profession were more alert. A brief illustration is the type of "cure-all vitamins" that contain folic acid and vitamin B_{12}. These remarkable capsules may well obscure an otherwise readily recognized case of pernicious anemia. The drug house contact men are an earnest, hardworking, and well-intentioned group. We might well ask ourselves if this is the proper way for the practicing physician to learn about the results of research. Too often anything that is new with an intriguing name seems to be considered the latest thing, the final work of some intensive investigation, whereas it is frequently something that has not proved its worth but is dressed up in a new costume with a fancy name.

Beckman, in a recent article entitled "To Use the New Drug or Not to Use It—That Is the Question," stated, "If a new drug is derived from an old folk remedy, the chances are that it is worth paying attention." He also stated that "all drugs, even the very best and least noxious of them, are psychologically and physically potential toxic agents." He stresses that, as a result of research, new drugs have brought new responsibilities to the manufacturer and to the physician. The former should be sure to explore all possible reactions of a new drug. The latter should learn how, when, and when not to use these highly potent compounds.

Would it not be an excellent idea to have a screening service whereby all information on worthwhile research could be catalogued? Such a method would give an excellent cross section and birds-eye view of proved research data. It is pertinent that the Institute for Advancement of Medical Communication has taken on the task of clearing the jammed channels of medical communication. Heading the list of projects under development by the institute is a specific plan for speedy interchange of research findings among investigators. The primary aim is to develop and test improved methods of communication in three main channels: (1) among research investigators, (2) between investigators and practitioners of medicine, and (3) between teachers and students in medicine. Such methods should be explored. Waldo Chamberlin, professor of government at New York University, has felt that national efforts along these lines would be "wasteful, inefficient, and expensive." He champions such a service or agency within the framework of UNESCO. These steps are in the right direction.

By the same token, the practicing physician should not wait to be spoon-fed but should avail himself of the opportunity to review the collected information, which reminds me of something I read the other day. I can't quote it, but, to paraphrase it, it is stated that there is no great objection to making the diagnostic road smooth but there is strong objection to allowing the mind to coast along in neutral.

The optimum in the practice of medicine is reached, unquestionably, by the acquisition of the art in the practice of medicine plus a practical application of the results of research. It is the obligation and even the privilege of the practitioner of medicine to bring all the wonders and achievements of medical research to patients, for whom it was originally intended. If each of us would honestly apply these principles in our daily practice, the rewards of research would far exceed all the worldly wealth expended to make such research possible.

MAINTENANCE OF THE SYNERGISTIC RELATIONSHIP OF EDUCATION AND RESEARCH IN MEDICINE

James A. Shannon, M.D., Bethesda, Md.

The profitable interplay between research and instruction in the educational process is perhaps best emphasized by the defensible statement that a vigorous medical education program is no more possible in the absence of research than in the absence of instruction itself. This was recognized at the turn of the century by a small number of institutions which initiated medical education as we know it today. We have come a long way since that time but have not really experienced this interplay on a broad scale until quite recently.

Subsequent to World War II, the nature of the relationship has been well understood—but not so the problems of its maintenance. These are inadequately studied and only infrequently acknowledged. For "maintenance" is a practical term. Given the desirability, even the essentiality, of achieving conditions which permit the cumulative effectiveness of medical instruction and research to be greater than the sum of the two, how—in specific terms—can this be accomplished? Whose responsibility is it? Where should the money come from, and under what circumstances should it be made available? These are pressing public issues as medicine faces the twin challenges of growth in size and in complexity.

Areas of Concern

There are three areas in which the maintenance of the synergistic relationship of teaching and research is of primary concern. The medical institutions themselves must have the resources and the resourcefulness to combine in the measure they deem appropriate the elements that make up a modern environment for teaching and research. This implies breadth (in terms of the range of disciplines and specialties involved); balance (in terms of the relative emphasis on teaching and research); stability (in terms of the basic financing of the institution and its full-time faculty); and independence (in terms of the ability of the institution to set up and pursue its own objectives). As one appraises our medical institutions today in relationship to their capacity to meet the challenges of tomorrow, it is abundantly evident that the principal factor will be resources rather than resourcefulness.

A second area of concern in the matter of balance between teaching and research is in the substance of the undergraduate and graduate medical educational experience itself. Certainly such factors as the increasing demands placed on physicians for understanding of diverse fields of medical science and the increasing importance of medical school and related environments as a source of scientists and teachers, as well as physicians, highlight the need for weaving the basic sciences—the behavioral and the physical as well as the biological—more closely into the fabric of our teaching institutions.

A third area for concern in the question of medical teaching and research has to do with the experience and contributions of physicians, scientists, and teachers who have completed their formal training but for whom education and research are a never-ending process. It is of the utmost importance that the mechanisms for interchange and refreshment be strengthened and expanded to permit the individual to advance in his own and related fields, for medicine has changed dramatically in the past 20 years and certainly will continue to do so. Teaching must be of a nature that permits subsequent growth of both student and teacher.

Although there are some who dissent, one feels a strong consensus that the present "balance," if you will, among teaching, research, and service in the United States represents the public and professional interest and is reasonable. Assuming this to be true, the problem is to maintain such balance in the years ahead. This problem can best be examined in the context of the medical school, where teaching, research, and service are inseparable.

I feel that the medical schools are at another critical stage in their general evolution. There is pressure to provide more physician training and at the same time to modify the substance of medical education. There is also pressure to expand the research base of the institution. These pressures become critical in the face of inadequate funds for operations and for plant expansion. Expressed in specific terms, this means an inability (1) to establish a suitable number of rewarding career positions; (2) to modernize, expand, or replace inadequate facilities; and (3) to develop institutional goals that are both reasonable and attainable.

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MAINTENANCE OF THE SYNERGISTIC RELATIONSHIP OF EDUCATION AND RESEARCH IN MEDICINE

James A. Shannon, M.D., Bethesda, Md.

The profitable interplay between research and instruction in the educational process is perhaps best emphasized by the defensible statement that a vigorous medical education program is no more possible in the absence of research than in the absence of instruction itself. This was recognized at the turn of the century by a small number of institutions which initiated medical education as we know it today. We have come a long way since that time but have not really experienced this interplay on a broad scale until quite recently.

Subsequent to World War II, the nature of the relationship has been well understood—but not so the problems of its maintenance. These are inadequately studied and only infrequently acknowledged. For "maintenance" is a practical term. Given the desirability, even the essentiality, of achieving conditions which permit the cumulative effectiveness of medical instruction and research to be greater than the sum of the two, how—in specific terms—can this be accomplished? Whose responsibility is it? Where should the money come from, and under what circumstances should it be made available? These are pressing public issues as medicine faces the twin challenges of growth in size and in complexity.

Areas of Concern

There are three areas in which the maintenance of the synergistic relationship of teaching and research is of primary concern. The medical institutions themselves must have the resources and the resourcefulness to combine in the measure they deem appropriate the elements that make up a modern environment for teaching and research. This implies breadth (in terms of the range of disciplines and specialties involved); balance (in terms of the relative emphasis on teaching and research); stability (in terms of the basic financing of the institution and its full-time faculty); and independence (in terms of the ability of the institution to set up and pursue its own objectives). As one appraises our medical institutions today in relationship to their capacity to meet the challenges of tomorrow, it is abundantly evident that the principal factor will be resources rather than resourcefulness.

A second area of concern in the matter of balance between teaching and research is in the substance of the undergraduate and graduate medical educational experience itself. Certainly such factors as the increasing demands placed on physicians for understanding of diverse fields of medical science and the increasing importance of medical school and related environments as a source of scientists and teachers, as well as physicians, highlight the need for weaving the basic sciences—the behavioral and the physical as well as the biological—more closely into the fabric of our teaching institutions.

A third area for concern in the question of medical teaching and research has to do with the experience and contributions of physicians, scientists, and teachers who have completed their formal training but for whom education and research are a never-ending process. It is of the utmost importance that the mechanisms for interchange and refreshment be strengthened and expanded to permit the individual to advance in his own and related fields, for medicine has changed dramatically in the past 20 years and certainly will continue to do so. Teaching must be of a nature that permits subsequent growth of both student and teacher.

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Since it seems likely that funds in support of medical research will continue to increase, and since it is not clear from where the needed funds for the teaching process will be derived, those who design and administer the research support programs have a special responsibility to take into account and strengthen the capacities of the schools to carry out their total mission.

The program of the U. S. Public Health Service is a case in point. Through its appropriations from Congress, a diverse pattern of support for research has come into being. In the aggregate, the programs this year provide more than 125 million dollars to the medical schools alone, including nearly 73 million for research projects, 35 million for training, and 17 million for research construction. In some schools, these grants and awards constitute as much as one-third of the yearly expenditures. Under these circumstances, the terms and conditions of Public Health Service support become matters of deep concern to the schools and to all those who are interested in their capacity, stability, quality, and independence.

The Twenty-School Study

As part of its continuing appraisal of the impact of its programs on the schools and related institutions, the Public Health Service has recently initiated—with the cooperation of the Association of American Medical Schools and the American Medical Association—an intensive, short-term study of 20 representative medical schools. The study is not yet complete, but certain trends and views are of interest even in preliminary form. They are stated here as a series of impressions gained by our staff as they have visited the schools and begun to analyze the data the schools have provided.

First, although the principle is axiomatic, there seems to be increasing awareness that good teachers at all levels need an opportunity to do research, and vice versa, and that it is part of a school's responsibility to make provision for its faculty to do both.

Second, although several years ago the number of medical schools with the funds and facilities necessary to permit faculty to engage in substantial research was small, that picture has changed. At present—whether one uses dollars, number of faculty members, or apportionment of faculty time as his measure—essentially all of the medical schools being studied are moving toward a 50-50 division between teaching and research. In some schools, the dollars and time spent on research actually exceed those expended for teaching.

Third, in general, the relative emphasis on research appears to be greater in private than it is in state institutions, but there are notable exceptions to this. Certain of the schools have indicated an increase from 10 to 50% in their research components during the past decade.

Fourth, as part of our study, the schools were asked to project their distribution of research and teaching effort for the next 10 years under two assumptions: (1) with federal funds held constant and (2) with federal funds increasing at whatever the individual school felt to be an ideal rate. Under both assumptions, schools which now have a relatively low research expenditure propose to increase it. Given a free hand, private schools project a greater emphasis on research than state schools.

From these sketchy observations, it would appear that research in medical schools is becoming more and more a primary function. It will undoubtedly be necessary for the schools to recognize the inevitability of permitting teachers to expand their research function. One would wish that the granting agencies could be equally broad minded about permitting research-supported people to engage in or expand the teaching function. I am reminded, for example, of the fact that our own research fellowships carry a limit of 10% on the amount of time that can be devoted to teaching.

Our study (since our primary mission at the National Institutes of Health is the conduct and support of medical research and the development of resources through research training and research construction programs) is focused on the impact of our present programs and on the ways they should be changed in character and may change in dimension in order to meet the needs of medical science and of society in the years ahead. Naturally, most of the facts and opinions we seek have to do with the research side.

Support of the Teaching Function

It will come as no surprise to you, however, as it was not to us, that the schools studied put funds for construction of teaching facilities as their first priority need and funds for general operating expenses second.

In this, it seems to me, lies the primary challenge to the maintenance of synergism between the research and teaching functions in medicine. Established and accepted sources, both public and private, today support the research function adequately. The educational function, on the other hand, is restricted from its needed growth, both qualitatively and quantitatively, because adequate funds are not available.

This is a painfully familiar theme to those of you who have long been concerned with our medical institutions and have evidenced that concern in your personal and professional lives. It is a problem that will certainly be solved, but slowly and on the basis of small individual steps and public and professional awareness leading ultimately to consensus and united action.

In the meantime, given only the existing patterns of support, some things can be done to help avoid placing even greater stresses on our medical schools and related institutions. They all stem from understanding of the basic interdependence of the functions of the schools, requiring the terms and conditions of support to be designed with an awareness that *no one* function can reach its optimum level unless the other functions are maintained to permit a balanced and unified total effort.

For the different sources of support—private or public and federal, state, or local—this responsibility to support a part in the context of the whole will be evidenced in varying ways. For the National Institutes of Health, for example, it takes the form of continuous program modification, within our statutory authorities, so that needs that become evident to us are met to the best of our ability. In this, it must be remembered that NIH, as the principal medical research arm of the federal government, must be responsible to the people and to the Congress, must operate within policies set by the executive branch, and, at the same time, must be responsive to the needs of scientists and their institutions.

At any given point in time, elements of our program are in the process of modification, since they seek to be responsive to changing needs. Today, for example, we are seeking, through our legislative and appropriation processes, to modify our programs to achieve four primary objectives: (1) the ability to pay the full costs of the research supported by our grants, instead of only part of such costs as now provided under our 15% limitation on the payment of indirect costs: (2) the authority to provide for strengthening and stabilizing the research base by making available to the medical schools and related institutions what we now call institutional research grants (such fluid funds for research purposes, supplementing but not competing with research project grant funds, would permit the schools to regain a measure of discretion and control over their own research activities); (3) measures which will permit the schools to increase the number of full-time positions in research with faculty tenure; and (4) a gradual change in the specificity and duration of research project grants, so that they are awarded for less rigidly defined studies and accorded support over longer periods of time.

All of these are derived from our perception of the needs of the schools, the long-range as well as the immediate strength and productivity of their medical research effort, and the established role of the federal government as having direct interest in the medical research component of the nation's institutions of higher learning.

I cannot surmise what the fate of these concepts may be. But I thought I should share our thoughts with you who are vitally concerned with the many factors influencing future developments in medical research and medical education, recognizing—as I know you do—that these and all other major modifications in our programs must be measured in a wide variety of professional and public forms before they can be brought into being.

Such program developments, whether they deal with the substance of science or a mechanism for its support, suggest that our attention is now centered primarily on the needs of the institutions which are the heart of our nation's research and teaching effort.

Superseding all other needs, in the long run, is the need of the schools to achieve, and to speak with, a strong and unified voice. The hopes and expectations of millions of Americans and of people everywhere are centered in the medical institutions, and the groups with a special interest in the schools are willing, even eager, to speak in their behalf. It is right that they should do so. But the profession must not depend solely on such support. A way must be found for the schools themselves to capitalize on the latent power and prestige that is implicit in their position of leadership in medical affairs.

POSTOPERATIVE PANCREATITIS.—Acute pancreatitis is found occasionally as a postoperative complication, mostly after biliary tract surgery and after gastrectomies. This is a serious, often fatal, complication. . . . Since a fatal outcome may possibly be prevented by therapeutic measures directed against the pancreatitis, it is of utmost importance to make the diagnosis in time, and the only means of doing this is the serum amylase test. If the serum amylase level is elevated following operation, we may well assume that we are dealing with a pancreatic complication. One of us has made it a routine to order serum amylase tests during the first postoperative days if the pancreas was traumatized at operation and likewise after all upper abdominal operations if the postoperative course is not as smooth as anticipated. We had a number of cases with postoperative rise in serum amylase. All of them recovered uneventfully after being placed on a pancreas-protective regimen, which, in addition to routine orders, consisted of repeated intravenous administration of 6% Dextran solution, one of the best means to combat pancreatitis.—H. L. Popper, M.D., and H. Necheles, M.D., Ph.D., Pancreas Function Tests, *The Medical Clinics of North America*, March, 1959.

MAJOR FACTORS INVOLVED IN RECONSTRUCTING THE MEDICAL CURRICULUM

John A. D. Cooper, M.D., Ph.D., Chicago

The ferment and rapid changes characterizing the status of medical education in the past decade give every promise that future developments will cut deeply into the fabric of our present patterns for the preparation of the physician. There are probably a number of as yet unforeseen factors which will effect further alterations in our present concepts of the curriculum. Out of the many possible ones, I have chosen three topics to bring into focus in my discussion. They fall in the general areas of the student, a liberal education for medicine, and the changing social character of our population.

The Student

I would first like to turn attention to the students who will enter our medical schools of the future. A basic and integral part of any educational program, their qualities and abilities help mold to a considerable extent the nature of the program.

Despite their importance in the scheme of things, far too little attention has been paid to improving the quality and size of the pool of applicants from which choices can be made in selecting our classes. Projective reports of increasing numbers of applicants to medical schools in the next decade do not give information about their quality. There is good objective evidence that the quality of the applicants and in turn of those accepted is declining. As recently as 1950, 40% of enrolled medical students had premedical grade point averages of A, an equal number had a B average, and about 20% entered with a C average. For the 1955-1956 class, only 16% had an A average, 71% had B averages, and the remainder had C averages. There has been little change in the 1956-1957 medical class.[1] The figures I have given represent averages, and there is considerable variation among the individual medical schools. Some are blessed with student bodies in which 70% have A averages in their premedical preparation, but some are not so richly endowed and 70% of their students have C averages.[2] Although grades do not entirely establish suitability for the study of medicine or subsequent practice as a physician, they certainly serve as one of the guideposts.

This turn of events, unless it can be reversed, will create a real dilemma—the increasing mass of scientific knowledge in medicine, the medical sciences, and the behavioral sciences and the deepening complexity of medical practice call out for students with even greater intellectual capacity and dedication than in the past. If students are not equal to this heavier burden, there can only be compromise with the high level of education necessary to properly prepare them for the profession.

The changing social character of the student is probably responsible in part for the change in the attractiveness which medicine holds for him. Modern youth seems less given to dedicated pursuits and the desire for achievement. Idealism is on the wane, and the individual has difficulty in establishing and maintaining values and goals which differ from those of the masses. Conformity and homogeneity characterize the age, and there is every promise that the trend will not be interrupted in the future. These attributes do not mark those who are interested in and willing to undertake the long and difficult preparation for medicine and to accept the demands which practice requires.

Medicine is finding increased competition for the pool of top-ranking students because it no longer occupies the unique position as a profession which it held in the past and shared largely only with law and the ministry. The professions open to the college graduate are now much broader, and they provide the prestige, intellectual satisfactions, and financial rewards comparable to those offered by medicine. Furthermore, faculty members in the college are in an ideal position to pick out the best students in their classes and convince them to abandon their original intent to study medicine and elect instead graduate study in the department. The letters of recommendation which come to admissions committees with the statements "He is too good a student for medicine," or "I have tried to convince him to follow a career of research in chemistry," tell the story of the cases where they have failed. Medicine has no opportunity to effectively combat this spiriting away of our best students.

The vast sums of money available for fellowships and research assistantships in the expanding research budgets almost guarantee the total expenses of graduate education for all but a small fraction of students in the physical, biological, and behavioral sciences. Medicine has no equivalent source of subsidy for its students. In addition much research, even in areas traditionally reserved for medicine, is being carried out by investigative teams which include both physician and nonphysician scientists. The members of the group participate essentially as coequals, and the physician oftentimes does not rank above his colleagues, even though the problem being studied is directly concerned with a disease process. This new freedom of opportunity permits talented young men and women to partici-

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Associate Dean, Northwestern University Medical School.

Read before the Annual Congress on Medical Education and Licensure, Chicago, Feb. 10, 1959.

pate in challenging and rewarding activities in fields closely related to medicine without the requirement for an M.D. degree. The physician retains his unique status only in being responsible for the patient's welfare, a privilege which apparently has diminishing appeal for the high-ranking modern student. As the scientific and technological bases of our existence further broaden, we can anticipate only increased competition by engineering schools and graduate programs outside of medicine for the relatively ever less adequate pool of good students.

The inordinate length and cost of the total educational program for medicine, measured not only in the monetary outlay but also in the years of income which it denies, is certainly having its influence on career choices. The biochemist in a graduate program can begin to support himself and a family even before he receives his Ph.D. degree. Engineers have little difficulty in finding good jobs after graduation. Because of the student's long period of study in medicine during the years when his contemporaries in other fields are starting their families, and his prospect of additional semi-indentured service as an intern and resident, medicine is finding increased difficulty in competing with the attractions of other professions. The declining fraction of college students seeking a career in medicine and the well-established increased future needs for physicians compound even further the predicament in which medicine may find itself.

There are partial solutions to these problems already apparent: an active recruitment program in the high schools and colleges similar to the one so successfully employed by engineers, well-considered plans for shortening of the over-all program, and the granting of higher professional and economic status to the physician in specialty training.

If we fail to attract into medicine an adequate number of top-notch students who can acquire and use the broader and deeper understanding of basic biology and behavioral sciences in the care of patients, our educational program will of necessity have to lower its goals to fit the students with which it is provided.

Liberal Education in Medicine

The rapidly mounting mass of knowledge basic to medicine and the medical sciences is posing serious difficulties in properly relating it to patient care and the present patterns of medical education. There is every likelihood that the difficulties will increase, because knowledge is increasing not linearly but exponentially.

Hope for success in meeting this challenge requires that bold action be taken to reappraise our present concepts for preparing the physician. Although we are quick to denounce premedical education directed toward the accumulation of facts rather than the deliberate cultivation of the power to think and to think painstakingly, we are loath to apply the same criteria in evaluating our own educational programs. We ask that the colleges not give us computers which regurgitate without modification or understanding the facts which have been programmed into them, but all too often the educational program for medicine lays stress on these accomplishments.

Experimentation is clearly called for, and its beginnings are already visible. As Darley pointed out in this Congress, the methods of patient care and medical education must be subjected to the same study and experimentation accorded to the scientific disciplines. The experiments now in progress are providing valuable information, but their scope is still inadequate. As they spread there will be an effect on the medical curriculum through the diversity which they foster.

One of the probable directions in experimentation will be the introduction of greatly increased flexibility into the present, still overrigid curriculum. The flexibility will appear in the total length of the educational span for medicine. Students will be permitted to progress at the rate which their emotional development and scholastic achievements dictate. This philosophy, which has pervaded the thinking at the secondary school and college level, has made little inroad into medical educational circles.

Increased flexibility will permit design of programs to fit the interests and requirements of the individual student. Every graduate of the medical school will not have had the same lock-step curriculum as his classmate. Acceptance by medical educators and licensure bodies of the thesis that the sum total of medical knowledge cannot be imparted to the undergraduate medical student and that students come with individually varying needs and resources will open up the possibilities of constructing a program of "liberal education" for medicine. There is little doubt that there will be far-reaching effects on the medical curriculum.

Changing Social Character of Our Population

The third factor which I wish to consider that will probably have an effect on medical education is the changing social character of the American people. This effect will occur indirectly through its influence on medical practice and the concept of the physician's responsibility for the emotional problems of his patients.

The rediscovery of the patient and the concept of comprehensive medicine describe important directions being taken in modern medical care. The importance of orienting medical students to look beyond the pathological process and treat the patient as a whole is receiving wider acceptance. Opportunities for the unhurried recognition of factors within the patient and his ecology which might be involved in the aggravation or cause of his illness, or in the promotion of his health, are beginning to be supplied in the clinical teaching programs of an increasing number of medical schools. One important facet of the "whole patient," however, has not received the attention it is due—the way in which he is changing in our developing culture. This information is becoming of increasing importance because of its influence on our concepts of the role which the physician can be reasonably expected to play in coping with the character disorders which he finds in his patients.

The marked alterations taking place in the social character of our time have been widely chronicled by Riesman and associates,[3] Commager,[4] Wheelis,[5] and others. The influence which these changes have exerted on the practice of psychoanalysis has been pointed out by Wheelis in his book entitled "The Quest for Identity." I would like to broaden the ideas which he develops to wider areas of medical practice.

We are living in an age of uncertainty. As Wheelis has written, "The questions of adolescence—'Who am I?' 'Where am I going?' 'What is the meaning of life?' receive no final answers. Nor can they be laid aside. The uncertainty persists. The period of being uncommitted is longer, the choices which terminate it more tentative."

The neurotic pattern and personality problems are evolving from the symptom neurosis so clearly described by Freud to character disorders whose amelioration requires provision for the patient of a value system, answers to the "confusions of the age," and direction in deciding what is worth fighting for and how strong the fight should be. The enormity and nature of the help required by the patient in orienting his life raise serious questions about the part which the physician should take in helping with their solution. The attention and support which the patient must have in solving the problem of his identity are of a different order of magnitude than those required for freeing man from the internal tyranny of his character. The approaches and techniques developed to cope with yesterday's problems do not meet the needs of a completely different type character disorder.

The enormity of the challenge presented by the uncertainty which pervades our culture will make it necessary to develop new techniques. Unless there is a marked increase in the relative number of physicians to the population, there will not be sufficient time in the physician's day to deal with more than the psychological parameters most closely related to the presenting disease. Complete rehabilitation of the patient will require the interplay of a team of which the physician is only one member. The medical schools must foster the development in their students of the attitudes and knowledge which will permit them to take the fullest possible advantage of the help which this combined approach can offer. Psychiatry and psychology as they are presently conceived are not designed to provide individuals with values and goals—it would appear that the sociologist may supply the direction which the problem requires.

These represent three factors which I think may have considerable influence on our education for medicine in the future—there are many others that I might have chosen but time and clouding of the crystal ball suggest that I end here.

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POSTOPERATIVE STRICTURES OF THE BILE DUCTS.—Man-made strictures of the bile duct . . . account for 80% of all the so-called benign or simple strictures of the bile ducts. . . . Postoperative stricture of the bile duct is one of the most tragic complications seen today in the practice of abdominal surgery. . . . The tragedy of this calamity can be gauged by remembering that 70% of the patients are women, 40% are under the age of 50, and only about 60% of these cases are permanently cured by a reconstructive procedure. It is estimated that some 30% of such patients will eventually die from the attempts made to repair the stricture or from the effects of intermittent or complete biliary obstruction. Many of these unfortunate patients have had several unsuccessful operations for relief of the obstruction before being referred to a specialist in this field. . . . It is impossible to estimate the incidence of postoperative stricture of the bile passages, but there is no doubt that injuries of the common duct related to cholecystectomy have increased, and it cannot be questioned that the number of common duct injuries is much too great.—R. Maingot, Post-Operative Strictures of the Bile Ducts, *Annals of the Royal College of Surgeons of England,* March, 1959.

CLINICAL NOTES

COMPRESSION FRACTURES OF THE THORACIC VERTEBRAE IN A PATIENT WITH TETANUS

Cornelius Colangelo, M.D., Chicago

Tetanus is a disease caused by an anaerobic bacillus, Clostridium tetani, and characterized by stiffness of the jaw and tetanic spasms of the neck and back. The agent causing tetanus is found in soil and in the gastrointestinal tract of man and many animals. It has been isolated occasionally in man from the body surface and oral cavity. Essential to the development of tetanus is the preexistence or fresh deposit of spores in tissues favoring their growth, i. e., traumatized, inflamed, or necrotic tissue. On occasion such conditions prevail without trauma, and in these tetanus may develop without any apparent wound. The case to be presented is in this category.

The tetanus bacillus elaborates a toxin affecting the anterior horn cells of the brain stem and cord and the myoneural end-plates. Thus, the chief clinical manifestation is tonic spasticity of various voluntary muscle groups, and the symptoms vary with the muscles involved. On this tonic spasticity (rigidity) are imposed intermittent tonic spasms (tetanic convulsions).

The onset is usually marked by restlessness, generalized aching, irritability, difficult swallowing, and fever of 100 to 104 F (38 to 40 C). Stiffness of the jaw is the most common initial symptom and is due to masseter muscle spasm. As the disease progresses, rigidity of the neck, back, abdomen, and extremities becomes more pronounced, and there may be a grotesque grin due to involvement of the facial muscles. The masseter muscle spasm becomes severe and restricts mouth opening (trismus).

Tonic spasms are frequent, brief, painful, and accompanied by sweating. The teeth are clenched, the back and neck are arched (opisthotonos), the abdomen is taut, the extremities are rigidly extended, and the patient cannot cough or speak due to contraction of the muscles of respiration. If the spasm lasts long enough, interference with these muscles (diaphragm and intercostal and glottic muscles) can produce anoxia, cyanosis, and even death. The cause of death, however, is usually less apparent and is generally attributed to exhaustion.

The symptomatology is quite varied, especially at the onset when there may be headache, chilliness, stiffness of gait, abdominal pain due to muscle spasm, pain in the back and neck, and tongue biting. In those patients who recover, the signs and symptoms reach maximal intensity and then gradually recede.

According to the "Textbook of Medicine," edited by Cecil, Loeb, and others,[1] there are no laboratory procedures which are helpful in the specific diagnosis or management of tetanus. It further states that bacteriological examination as a means of diagnosis not only is almost worthless but also may be dangerously misleading.

Treatment in tetanus is based on sedation to control the irritability of the nervous system responsible for muscular rigidity and spasms and on destruction of the toxin or of the bacillus elaborating it. Of almost equal importance is the use of antibiotics to control the frequent complication of pulmonary infection.

A common complication of tetanus in children is compression fracture of several thoracic vertebrae. Caffey[2] states that Dietrich, Karshner, and Stewart found compression fractures of the thoracic vertebrae in 70% of a group of children who had recovered from tetanus. One or more segments near the apex of the thoracic curve were affected. Veronesi[3] found "vertebral changes" in 87% of a group of tetanus patients who were 1 to 20 years old. He described flattening, sometimes considerable, of the thoracic vertebrae, especially T-4 through T-7. The superior portion of the body was usually involved. This article was based on work done in Brazil where tetanus is common and was published in 1956. From then to September, 1958, the medical literature provided only two references to vertebral fracture,[4] and these were from Russia where tetanus is also probably common. Each reference concerned fractures of the thoracic vertebrae in a child.

Report of a Case

The case of tetanus to be reported was considered noteworthy because multiple compression fractures of the thoracic region of the spine developed in the course of the disease and because the disease occurred without a visible wound or trauma.

The illness began in this 16-year-old boy with chilliness, diffuse backache, stiffness in rising out of chairs, and lassitude. The next day the jaw was stiff, markedly limiting opening of the mouth, backache was severe enough to prevent sitting erect, thirst was prominent, and swallowing was so painful that only fluids were taken. The patient described

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From the Alexian Brothers Hospital.

this symptom as a "very sore throat." That night there was fever of 103 F (39.4 C), restlessness, and groaning due to generalized aching. During the next two days there was chilliness, fever, poor appetite, epigastric soreness, inability to walk straight, painful stiff neck, and backache so severe that a pillow had to be placed behind the back to permit sitting. At this time he was seen by a physician who promptly sent him to the hospital.

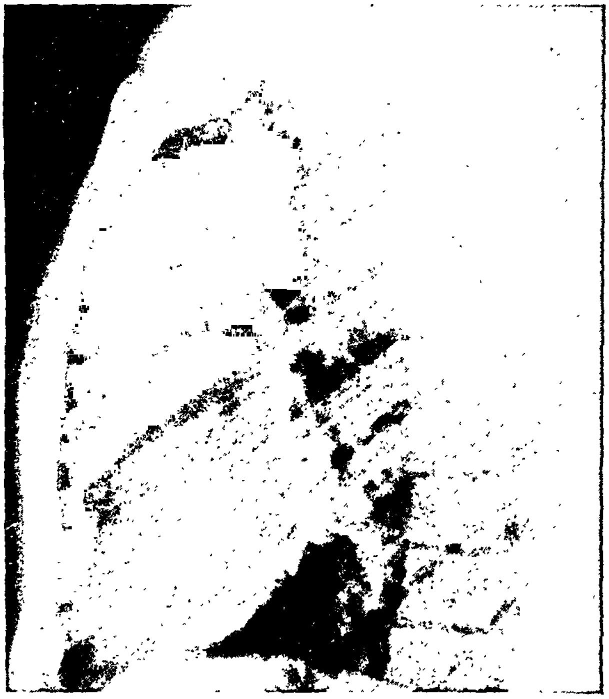

Fig. 1.—Normal lateral thoracic part of spine.

Examination of the boy on his admission to the hospital revealed the temperature to be 98.6 F (37 C), pulse 98, respirations 18 per minute, and blood pressure 130/60 mm. Hg. There was pharyngitis and gingivitis. The tongue was inflamed and showed several shallow ulcers. The jaw was stiff, greatly restricting opening of the mouth. The muscles of the neck, face, and back were stiff, and coughing or turning caused pain in the back. The abdomen was rigid, and there was left hypochondriac tenderness. There were crepitant basal rales bilaterally. There was no history of a previous significant illness, no history or evidence of a wound or contusion, and no history of immunization against tetanus.

Because of the basal chest rales, posteroanterior and left lateral chest films were made, as is routine in this hospital. There was haziness in the right costophrenic sinus area consistent with pleuritis or atypical pneumonitis. On the left lateral view the thoracic vertebrae appeared normal (fig. 1).

During the next two weeks, the patient had a temperature of 100 and 101.4 F (37.8 and 38.5 C) on the first two days, but thereafter fever was insignificant. Prominent features were frequent, daily, brief, painful tetanic spasms of the neck and back; opisthotonos; trismus; frequent troublesome cough with yellowish expectoration; painful swallowing restricting food intake to fluids and occasionally preventing even that; fetor oris with gingivitis; and ulcerative glossitis. There was also poor appetite, pain in the chest and abdomen, and occasional tongue biting.

There were three episodes of dyspnea and cyanosis associated with efforts to cough and expectorate. The first lasted 10 minutes and produced brief syncope; the other two were shorter. All were relieved by placing the patient upright. During these attacks the patient felt that he was strangling or choking, and he could not cough or speak.

Aching in the thoracic region of the spine became severe during the second week, leading to x-ray examination of the cervical and thoracic regions of the spine on the 19th day of the illness. The cervical region was normal. The thoracic region showed compression fractures in the bodies of T-3 through T-9 involving the superior portions. T-5 showed the greatest compression, amounting to 60%. There was equivocal anterior subluxation of T-3 and T-4. Thoracic kyphosis was slightly increased, the apex of its convexity being at T-4–T-5 (fig. 2). The patient then was fitted with a back brace.

The laboratory findings were not diagnostic. The entrance examinations showed 1+ albumin in the urine; leukocytes, 11,000 per cubic millimeter, with 5 eosinophils; negative serology; and a sedimentation rate of 34 mm. (normal 0-9). The cerebrospinal fluid was normal. No cells were seen in it, and a 48-hour culture was negative. A throat culture did not produce any specific growth. A gum swab on Gram staining revealed many mixed organisms. Culture showed a mixed growth resembling alpha streptococcus, Bacillus subtilis, nonpathological Neisseria, and Hemophilus hemolyticus. The following blood analyses were normal: calcium, phosphorus, urea nitrogen, acid and alkaline phosphatase, total protein, and albumin and globulin levels.

Hospital treatment included administration of analgesics and aspirin, as needed for pain; cough medicine, as needed; sterile penicillin-dihydrostreptomycin for suspension (Combiotic), one vial daily for the first three weeks; chlorpromazine (Thorazine) hydrochloride, 100 mg. daily intramuscularly for the first two weeks, 150 mg. for the third week, 200 mg. orally daily for the next three weeks, 100 mg. daily for one week, and then discontinued; methocarbamol (Robaxin), 5 mg. four times daily, until improvement began, then decreased gradually and discontinued at the end of the seventh hospital week; phenobarbital, 2 grains (0.12 Gm.) daily for the first week, then 4 grains (0.25 Gm.) daily until discontinued at the end of the eighth week; diphenhydramine (Benadryl) hydrochloride, 50 mg. twice daily from the third week through the remainder of the hospital stay; diphenyl-

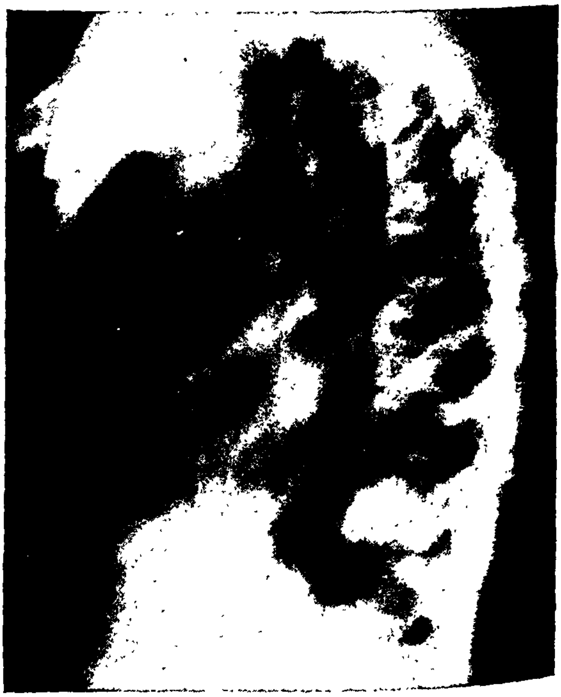

Fig. 2.—Lateral film of thoracic part of spine showing compression fractures in bodies of T-3 through T-9.

hydantoin (Dilantin) sodium, 1.5 grains (0.1 Gm.) twice daily for the two and one-half weeks in the later part of hospital stay and then reduced to 1.5 grains daily for the remainder of the hospitalization; and 50,000 units of tetanus antitoxin during the early part of the illness, followed by three doses of 5,000 units at spaced intervals.

The symptoms reached their peak coincident with the discovery of the spinal fractures. Thereafter they began to recede slowly and intermittently, although opisthotonos and infrequent tetanic spasms were still present at the end of the fourth week. At the end of the seventh week there were no symptoms or findings of tetanus. Repeat films of the thoracic region of the spine at this time did not show any change from the first films other than the development of osteoporosis due to inactivity.

The patient was discharged on the 61st day of the illness, wearing a back brace and walking.

Comment

Fractures of the thoracic region of the spine are a frequent complication in childhood tetanus. The physiological kyphosis of the thoracic part of the spine in the juvenile, the sustained muscular contraction, plus the tetanic spasms combine to produce fractures of these spongy, relatively delicate cubes of bone. The apex of the thoracic kyphosis acts as the fulcrum.

The source of the infection in this patient is not known. It could have arisen in the severely inflamed gums and tongue. The case report illustrates the value of the lateral view in the routine roentgenologic examination of the chest. It is admitted that this is a rare instance, yet without the normal appearance of the thoracic area of the spine on the earlier lateral chest film the later films of the spine might have been more difficult to evaluate.

Summary

A case of tetanus occurred in a 16-year-old boy. The source of the infection was not apparent, and the infection was complicated by compression fractures of the third through the ninth thoracic vertebrae. The patient recovered.

1200 Belden Ave. (14).

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COUNCIL ON FOODS AND NUTRITION

Report to the Council

The Council has authorized publication of the following report. The Council is pleased to acknowledge cosponsorship of the report by The Nutrition Foundation, Inc.

Philip L. White, Sc.D., *Secretary.*

AN ADEQUATE DIET

Leonard A. Maynard, Ph.D., Ithaca, N. Y.

An adequate diet is one which meets in full all the nutritional needs of the person. These needs are set forth for infants, children, boys, girls, men, and women in the report[1] entitled Recommended Dietary Allowances. The data in this report are based on an exhaustive review of all of the research and other information available up to the time of its publication in 1958. These data are considered to provide the basis for a fully adequate diet for all normal persons as is indicated by the following quotation:

> These allowances are designed to maintain good nutrition in healthy persons in the United States under current conditions of living and to cover nearly all variations of requirements for nutrients in the population at large. They are meant to afford a margin of sufficiency above minimal requirements and are, therefore, planned to provide a buffer against the added needs of various stresses and to make possible other potential improvements of growth and function.

In providing for the needs of all healthy persons, including those subject to various stresses, the recommended dietary allowances exceed the requirements of many persons. Thus, failure to meet them fully does not mean that a given person is thereby undernourished. On the other hand, the allowances are not designed to be adequate to meet additional requirements which may be associated with disease or needed by severely depleted persons and which may call for supplementation ac-

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From the Graduate School of Nutrition, Cornell University.

cordingly. The allowances should not be confused with the generally lower minimum daily requirements established for the Food and Drug Administration for labeling purposes and considered to be the amounts needed to prevent symptoms of deficiency and to provide a small factor of safety.

There are a few nutrients known to be essential in human nutrition or presumed to be essential, on the basis of animal experiments or in vitro studies, for which definite allowances have not been established. The Food and Nutrition Board report discusses these cases and cites the data available as to quantitative requirements and as to their content in foods. From these data it appears highly probable that any needs for these nutrients can be met readily by a mixed diet that is adequate in other respects. A case in point is represented by various trace elements which are associated with enzyme systems and are thus presumably essential in minute amounts but which are widely distributed in foods of either plant or animal origin.

Nutrient allowances are useful in practice only as they are translated into diets. Fortunately, the food supply of the United States is so large and provides such rich and varied sources of the nutrients needed that it is readily possible for everyone to have an adequate diet from foods available to him. The abundance of this food supply is indicated by the fact that during recent years, the per capita, retail, edible supplies of protein, iron, vitamin A, thiamine, riboflavin, niacin, and ascorbic acid have exceeded the per capita allowances for these nutrients by 40% or more. Thus, though surveys continue to show that a substantial number of households and individual persons fail to consume diets which fully meet the recommended dietary allowances for all nutrients, it is not to be construed necessarily that needed food supplies are unavailable or that the individual persons in question are malnourished. Such surveys do indicate a widespread lack of appreciation of the importance of an adequate diet and a lack of knowledge of how to select it.

Actually, due to the great variety of the food supplies readily available, there are many ways in which an adequate diet can be obtained. A very helpful guide for food selection has been issued[2] by the United States Department of Agriculture. In this publication, foods are divided into four groups, and directions are given as to how to choose a diet from these groups.

The milk group includes cheese and ice cream which may replace part of the milk. It is suggested that children receive three or four cups of milk, teenagers four or more cups, adults two or more cups, pregnant women four or more cups, and nursing mothers six or more cups daily. The milk group is counted upon to furnish the major portion of the calcium needs. It is an important contributor of high-quality protein and riboflavin and also provides many other vitamins and minerals, as well as carbohydrates and fat to meet energy needs. To supply needed vitamin D for infants, children, adolescents, and pregnant and lactating women, milk should be the product enriched in this nutrient.

The meat group includes beef, veal, pork, lamb, poultry, fish, and eggs, with dry beans, dry peas, and nuts as alternates. Two or more servings daily from this group are recommended. These foods are of special importance for the high-quality protein furnished. They are also important sources of iron, thiamine, riboflavin, and niacin and supply other minerals and vitamins as well. Variable amounts of fat, useful for energy needs, are furnished.

The vegetable-fruit group includes a long list of foods from which four or more servings daily should be selected. It is specified that these servings should include a dark green or deep yellow vegetable at least every other day to provide vitamin A, a citrus fruit or other fruit important for vitamin C daily, and other fruits and vegetables including potatoes. In addition to their large contributions of vitamins A and C, the four servings from this group also provide significant amounts of iron, niacin, thiamine, and certain other vitamins and minerals.

Four or more servings daily from the bread-cereals group are suggested. This group includes whole grain, enriched, or restored cereals. It is important for its contribution of thiamine, niacin, and iron and also furnishes worthwhile amounts of protein and certain other minerals and vitamins, depending on the specific source. The group provides these various nutrients and also calories at a relatively low cost.

The United States Department of Agriculture publication states that the minimum number of servings suggested forms the foundation for a good diet which can be rounded out by more of the same foods or others not mentioned, such as table fats, other cereal products, and sugar, to provide the additional calories and nutrients needed. The publication gives details as to the nutritional contributions of the foods in the different groups and as to how a daily food plan can be developed to insure an adequate diet. The information is summarized in a four-page pamphlet[3] which can be obtained in quantity from the Superintendent of Documents, U. S. Government Printing Office.

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MEDICINE AT WORK

- *Meals on Wheels*
- *Discipline Committee*
- *Libraries and Aged*
- *Figuring Fees*
- *Medical Museums*

Needed: Smog Doctor

Los Angeles County is looking for an epidemiologist. The position will be under Civil Service and will pay $13,284 per year. The job—smog doctor.

Angeleños have spent years reading, through smog-irritated eyes, almost daily news stories of governmental efforts to abate the city's air pollution problem. Industrial smoke ordinances, bans against trash fires, plans for auto exhaust attachments, and dreams of importing fresher air through mountain tunnels have done little to alleviate the man-made blight that all but cancels out the area's fabled sunshine.

The physician chosen for the post recently created by the Los Angeles Board of Supervisors will serve as an aide to County Health Officer Roy O. Gilbert, M.D. He says, "The position is intended to provide the County with an official viewpoint on the medical aspects of the air pollution problem. This will involve both clinical observations and statistical studies. It will also entail investigative effort in relation to research being conducted by others in the health implications of air pollution."

Although jokes dealing with the minor irritations of smog have become a staple of West Coast TV comedians, such humor is lost on those who are acquainted with smog's sometimes deadly effects. Surgeon General Leroy Burney of the Public Health Service has warned: "Investigators are finding a definite association between community air pollution and high mortality rates due to cancer of the respiratory tract."

Bringing Words to the Aged and Infirm

Libraries Find New Ways To Serve Elderly Patrons

In Racine, Wis., a bedridden oldster continues a life-long interest in reading by means of a ceiling projector for filmed books.

In Atlanta, Ga., physicians join with employment experts and government officials to give their time to a job clinic for senior citizens.

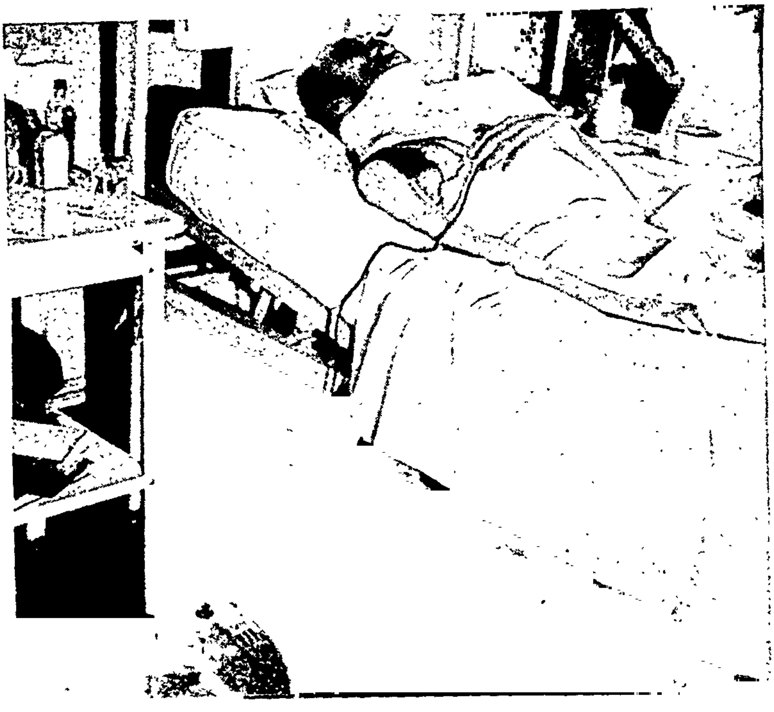
In Milwaukee, those who read to the housebound aged are offered a guide called "Let Us Read Aloud."

Despite the geographic spread these aids for the aging have one thing in common: They all are sponsored by libraries. The projects, and a number of similar ones, were explained by Milton Cummings, Ph.D., of the U. S. Office of Education, at a Washington meeting sponsored by the A. M. A. Committee on Aging.

In White Plains, N. Y., the public library—working with volunteers banded together as Friends of the Library—sends books and records to shut-ins, whether institutionalized or at home. The Huntington library in West Virginia accepts telephone orders for mailing books to readers free of charge.

A new library building in Montclair, N. J., has installed a self-service elevator for those in wheel chairs and a music area where groups can listen to records. The Free Public Library Commission of Wisconsin distributes a booklet entitled "The Advancing Years" listing books, pamphlets, reports, and surveys which should prove helpful to those working with older people.

Another pamphlet, "Books for Tired Eyes," is now in its fifth revision. Published by the American Public Library Association, it



Immobilized patient operates push-button control of ceiling projector, which makes more than 1,000 filmed books available to bedridden persons.

lists current books of interest printed in extra-large type for the benefit of older readers.

Most of these programs are adaptable to local conditions, Dr. Cummings said. Two similar Ohio plans deliver books directly to the sick and elderly both at home and in institutions. In Cleveland, the service is performed by librarian-specialists, but in Dayton, Ohio, the work is handled by volunteers.

At least one boon to the elderly came about partly by accident. The Chicago Public Library began a series of live and recorded noon concerts for Loop workers, only to find that the city's aged are now among the most enthusiastic listeners.

The Patient Stays Home in This Rehabilitation Plan

Medical teamwork is helping many chronically ill and disabled patients—most of them aged—return to at least partial self-care in New York's northern Westchester County. Team effort involves not only the patient's physician but a District Nurse and a physical therapist—and results in a plan of rehabilitative exercise to be carried out by the nurse in the patient's home. The program is sponsored by the District Nursing Association under a grant from the New York Arthritis and Rheumatism Foundation, which also makes available the help of a specialist in physical medicine as a consultant.

Here's how the program was explained in a recent issue of the Westchester County Medical Society's *Bulletin:* All patients on the nurse's schedule are reviewed by her for rehabilitative possibilities. Where restorative procedures seem indicated, the patient's physician is consulted. The patient is then given a rehabilitation evaluation by the plan's therapist, who consults with the physiatrist when necessary.

At this point, a plan of therapeutic procedures is worked out by the family physician, the therapist, and the nurse. The treatment agreed on is begun by the therapist and the nurse. In time the nurse is able to offer most treatment procedures, with the therapist dropping in occasionally to check on her progress. Once a month both nurse and therapist meet to discuss the patient's progress with a Health Department nutritionist and any social workers involved.

Rehabilitative services have been provided to more than 110 patients since the program was begun in 1956. Their median age was 64.5 years. Most suffered from stroke, degenerative diseases of the nervous system, arthritis, or hip fracture. Some of the rehabilitative procedures employed have been therapeutic exercise, heat application, moving from bed to chair, crutch walking, and the use of walkers.

Although few of the patients have been helped to the point of independence, nearly 70% show improvement, indicating that the restoration of even limited self-care is worth the effort expended.

Sometimes the little human attentions are as important to the "meals" recipient as the food the volunteers bring.

How Meals on Wheels Help the Shut-in

Tomorrow afternoon and every afternoon a station wagon will stop before a tenement building in Columbus, Ohio. Its driver will deliver one complete hot meal and enough cold food for two more to a shut-in incapable of providing adequate meals for himself. At almost the same time similar events will be taking place in Rochester, N. Y.; Philadelphia; and East Orange, N. J. These services are known as "Meals on Wheels."

Although they are similar in operation, the services have a wide variety of sponsors. In Columbus the service is operated by housewives led by a determined clubwoman. In Rochester and Monroe County it is being supervised by the Visiting Nurse Service and subsidized by the state health department. Philadelphia's "meals" program is operated by a settlement known as the Lighthouse, and in East Orange, the project is under the wing of 10 civic clubs.

It was in Philadelphia—spurred by the success of England's World War II plans to feed its bombed-out citizens—that "Meals on Wheels" had its American beginnings. Visiting nurses in the city's Kensington section pointed out to its Welfare Council that health breakdowns and hospital admissions resulting from grossly inadequate diets might be prevented by a plan that would offer adequate nutrition for those unable to provide it for themselves. The Council asked the Lighthouse to find an answer. The solution was "Meals on Wheels."

The Pattern Is the Same

Despite local variations all U. S. "meals" plans are essentially the same. Carefully planned hot meals are prepared in a central kitchen and delivered in warm containers. Accompanying the hot plate are sandwiches, cereals, fruits, and beverages to provide for much of the customer's caloric requirements for the rest of the 24 hours.

And customers they are, too. No client receives his meals free, although daily prices range from 30 cents to $2. Most plans provide a sliding scale of charges based on ability to pay. Deficits in operational budgets are covered in a variety of ways—foundation awards, service club donations, Community Chest appropriations, and fund-raising projects. Rochester's program will be subsidized through 1961 by the state health department as a demonstration project. In Columbus, "wheel" clubs meet monthly for card parties and donate their dues to the program.

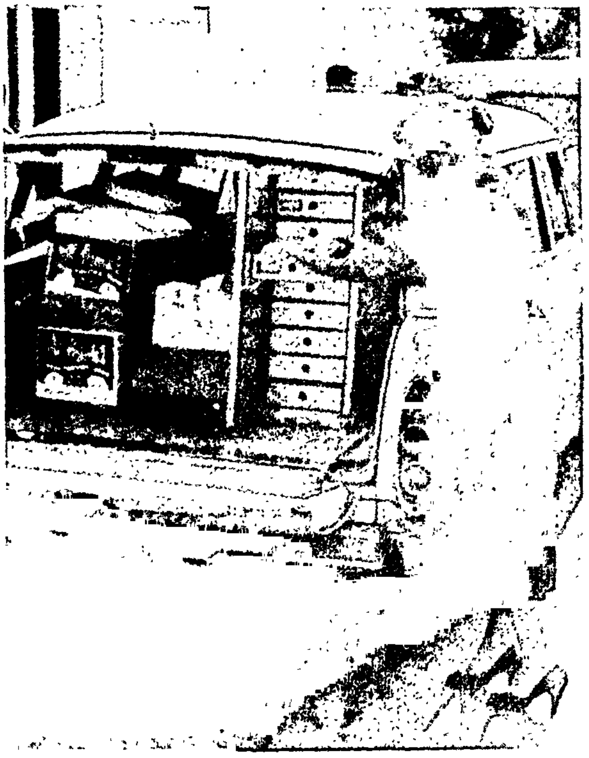
Physicians participate in some way in most of the plans. In many instances they are a source of referrals for the service. At least one service checks with its clients' physicians for special dietary orders. In Philadelphia Dr. Stanley Tauber acts as medical adviser to the Lighthouse project, which was given the 1956 Benjamin Rush award by the Philadelphia County Medical Society for its outstanding contribution to public health.

Three of the "meals" programs prepare their own food, hiring part-time kitchen help for the task. In Columbus arrangements have been made with two of the city's restaurants for hot food preparation. Many schemes have been tried for keeping food warm and palatable during delivery. Philadelphia volunteers put covered plates in reusable insulated bags which close with a metal clip. In Columbus meals are carried in a heated oven similar to that used by airlines.

Women and Teen-agers

Although some paid labor is used by each "meals" plan—usually cooks and kitchen help—reliance on volunteers is almost axiomatic. Not only do these unpaid workers keep costs down but they also furnish the friendly human contact that may be almost as helpful to the shut-ins as the food they bring.

In Columbus women members of "Meals on Wheels" substitute for the paid driver on week ends, allowing uninterrupted service through the week. In Rochester volunteers do almost all the work, from packaging meals to making deliveries. Two women are assigned to each car, one to drive and the other to make the actual delivery.



Airline-type carrier keeps food warm from kitchen to recipient in Columbus, Ohio.

In Philadelphia the Lighthouse program relies heavily on volunteers and has even attracted adolescent help. Teen-agers accompany staff drivers on their rounds and provide a measure of youthful company for "meals" recipients who would otherwise have little contact with the world outside.

All clients of these services have one thing in common: they would find it extremely difficult, if not impossible, to feed themselves adequately without the help of "Meals on Wheels." Most are elderly, handicapped by physical disability, and without family or friends to help.

Many newcomers joining the "meals" programs have been on a "tea and toast" diet for lengthy periods. "This is the first real food I've had in many a year," said one, and for the first few weeks of service, many complain of "too much food." Miss Izola Williams, Columbus nutritionist, says, "It appears they are unaccustomed to a full diet, or it is their custom to cut corners on food." The Columbus unit has found that if it can prevail on recipients to take food daily for three weeks, they will then maintain the schedule without urging.

One "meals" client—blind herself, and with a handicapped husband—was moved to write of her appreciation of the service, "We have been getting these meals for two weeks now, because of my husband's illness and my own handicap. It's wonderful not to have to eat burnt foods any more."

A.M.A. Disciplinary Committee

Toward "Heightening the Proper Practice of Medicine"

Are medical society grievance committees dealing adequately with the profession's tiny minority of errant practitioners? What is the number of this "tiny minority"? How might physicians better serve medicine's highest principles as well as the public by cracking down on the few "bad egg doctors" who are incompetent to the point of criminal negligence, who overcharge to the point of community revulsion, who evade their tax responsibilities to the point of court censure, or who run their practice while at the point of insanity or under drug addiction?

These and other gnawing questions came up for frank discussion last month in Salt Lake City at the first meeting of the new A. M. A. Medical Disciplinary Committee, which was created by the Board of Trustees during the Clinical Meeting in December. That session on April 16 represents the latest phase in a growing recognition by physicians that they must be their brothers' keepers in order to keep their art pure and holy. (See Medicine at Work, The Journal, April 5, 1958.)

In opening the conference, Dr. Raymond M. McKeown, a member of the Board of Trustees who serves as Committee Chairman, said: "The A. M. A. has become increasingly aware that someway, somehow, medicine should have something to say about the behavior of its practitioners. Those of us who have tried to bring about changes among the 3 to 5% of colleagues who are disreputable frequently lost out." Following are comments from other committee members:

"The 3 to 5% too often force us to live with their poor behavior, instead of we guiding them."

"We should launch our study on a more realistic approach to the fee situation, particularly as it relates to surgery."

"The fact that well over 90% of this nation's physicians are suffering from the antics of the other few per cent makes our mission strong."

"I consider physician overcharging of insurance companies the first goal for Committee study."

"Let's start gathering figures on what state medical license boards are doing to physicians convicted of unlawful acts."

"Many grievance committees are valuable for public relations but are not doing the job that needs to be done. Some are toothless watchdogs that bark but don't bite."

While calling for tighter control over the fringe of incompetent or dishonest physicians, the Committee as a whole by no means expressed any intent to undermine the profession's institution of grievance panels, 1,100 of which have been functioning in the United States since 1871—most effectively in the past decade, thanks to the diligence of more than 5,000 members both in and out of medicine.

One member of the new Medical Disciplinary Committee is Dr. James H. Berge of Seattle, who once headed his state society's grievance committee and is a founder and now chairman of Washington State's three-year-old Medical Disciplinary Board. The only body of its kind, this unit of state govern-

Physicians and attorneys chat informally (*left*) at luncheon between sessions of medicolegal conference in Salt Lake City, April 18. In front (*right*) are Gen. Frank Riter, representing American Bar Association, and Dr. U. R. Bryner (holding briefcase), president of Utah State Medical Association. Behind them are Dr. George M. Fister, member of A. M. A. Board of Trustees, and Ira A. Huggins, president of Bar Association of Utah. A. M. A. Law Division is scheduling another such regional series in 1961 (see Medicine at Work, The Journal, April 25, 1959).

Quotes on Conduct . . .

The whole profession should not be tarred with the same stick which should be applied to the few.

–Dr. Edward J. McCormick, on becoming A. M. A. President in 1953.

While it is never pleasant to find a colleague guilty and impose punishment, this is a responsibility falling on some of us.

–A. M. A. Judicial Council

Professionally, we doctors resemble dictators in alternating between complete disregard of criticism and exquisite sensitiveness to it.

–Alan Gregg, M.D., pioneer medical educator

If we individual physicians do not keep medicine's house in order, outside organizations–like hospitals or government–will do it for us . . . Our first responsibility is to our patients, and not to ourselves or our system of medicine.

–Dr. David B. Allman, Past-President of the A. M. A.

ment comprises a panel of physicians (elected by physicians) with power to censure, suspend medical license, or order outright revocation. Their rulings have been upheld in five revocation decisions taken to the state Supreme Court. "All of our actions," says Dr. Berge, "have been based on sound legal advice–not only from the board's counsel but from the state bar as well."

Cases cited by Dr. Berge at the Salt Lake City meeting last month covered unethical conduct involving nontherapeutic abortion, alcohol and narcotics addiction, income tax evasion, gross overcharging, and fraudulent billing to medical insurance companies. Penalties ranged from rebuke to revocation of license.

When the new A. M. A. Committee meets again in a few weeks, it is expected to draw up specific purposes and objectives, based on studies of the Washington board, various state medical practice laws, and related experience elsewhere in the United States. Dr. McKeown emphasized the Committee's basic motive when he told his colleagues: "We are here to find some acceptable method of heightening the proper practice of medicine without regimenting the profession."

Members of the A. M. A. Medical Disciplinary Committee are Drs. H. Thomas McGuire of New Castle, Del.; Paul G. Henley of El Dorado, Ark.; James H. Berge of Seattle; E. G. Shelley of North East, Pa.; and Raymond M. McKeown of Coos Bay, Ore., Chairman. Staff Secretary is Mr. C. Joseph Stetler of Chicago.

What Eight States Are Doing About Relative Value Studies

"We use our relative value study as a tool; we negotiate with it, and we'd have been in bad shape without it."

The speaker is Dr. John Rumsey of San Diego, Calif. The occasion is a Western-states regional meeting. His audience includes medical association officials from eight states west of the Rockies and a scattering of Midwesterners.

The group gathered in San Francisco last month at the request of the A. M. A. Committee on Medical Practices to talk about relative value studies and to review materials offered by the Committee to help state associations desiring to make such studies of their own (see Medicine at Work, The Journal, March 21, 1959.)

Dr. Rumsey was referring to the relative value study pioneered by the California Medical Association in 1956 after three years of work and the expenditure of about $50,000. He said, "We have used it in negotiations with Medicare, the unions, and in the county medical societies for grievance committee decisions."

Most of the state medical association representatives not only expressed an interest in pursuing relative value studies of their own, but in many cases had already begun the work and are borrowing heavily from California's experience and examples. Here is a round-up:

–Dr. William J. Reals of Wichita, Kan., reported that he and his Committee on Fees had spent 14 months preparing a relative value schedule for the Kansas Medical Society. He said, "The American public is committed to the budget system of paying its bills, and the public wants to budget its health expenditures too. Relative value studies have become a necessity."

–Dr. John DeTar of Milan, Mich., a member of the Committee on Medical Practices, said that the Michigan State Medical Society accepted the California study verbatim when it found itself needing one badly for negotiating purposes. He said: "We plan to follow up this action with a state-wide study of our own."

Arizona Yes–Colorado No

–In Arizona, according to Dr. Francis M. Findley of San Manuel, interest in a relative value study is high and the state association will probably make use of the California format. In the neighboring state of New Mexico interest in such studies is just beginning. Dr. John Corcoran of Albuquerque said a recently appointed committee expected work on the study to begin almost immediately.

–Colorado, on the other hand, has no plans for a relative value study, according to Dr. Cyrus Anderson. "Our physicians are opposed to a state fee

Theory of Relativity

Relative values is a rather high-sounding name for a simple concept:

—Values are unit designations assigned to medical procedures performed by the physician.

—Relativity is achieved by weighing each procedure according to the time, competence, effort, and experience required to perform it, as reflected by the physicians' customary charges.

For example, California's relative value study uses a unit value of 1 for a routine office visit, 2 for the first home visit, 10 for the first week of hospital care for a premature infant, and 20 for routine care of a well baby for one year (see Medicine at Work, THE JOURNAL, March 21, 1959).

schedule of any kind," he said. "We think we have a better arrangement in our flexible service plan which can be adjusted to a variety of income levels."

—Dr. James Buckley of Portland, Ore., said his state society's Prepayment Committee is working toward a revision of the Oregon Physicians' Service schedules, to be determined through a survey similar to that made in California.

—Dr. E. L. Calhoun of Aberdeen told the group that there is little interest in his state of Washington in the creation of a relative value study. He added, however, that the Committee's study is used in Washington as a check against fees.

—Nevada's 300 physicians will probably be surveyed soon. Dr. Arthur E. Scott of Reno said his state society's insurance committee had done some work in this field but is planning a more comprehensive job.

—Dr. Homer Smith of Salt Lake City said the Utah Medical Association already has a state fee schedule but that there is current interest in doing a relative value study as well.

Study Aids Available

Five A. M. A. publications developed to aid states planning relative value studies were displayed at the meeting. Included are a statement on the background and need for such studies (Relative Value Publication No. 1), a listing of code numbers and nomenclature based on the California model (RVP No. 2), a suggested format for the conduct of such a study (RVP No. 3), a check list of things to be done to make a study successful (RVP No. 4), and a series of questions and answers about such studies (RVP No. 5). Representatives of most states expressed the hope that the A. M. A. might be able to make the materials available in quantity for use in proposed studies.

Mr. Charles Williams of New York, representing the Health Insurance Council, said, "We are encouraged by California's development of a uniform nomenclature, and we are tending to use it as a replacement for our own. Many of our benefit schedules are out of date, and pay disproportionate amounts for services. Relative value studies will do a great deal for insurance companies."

Dr. Lester Bibler, chairman of the Committee on Medical Practices, told the group that theirs was the first in a series of informational meetings to be held on a regional basis. The second is being scheduled for the New England states on July 18 and 19.

A. M. A. Committee on Medical Practices meets in San Francisco prior to last month's regional meeting on relative value studies.

Dr. Reals of Kansas may have summed up the feelings of many physicians when he said, "If we don't make relative value studies of our own, someone else will. It may be done by our friends—but it might also be done by the government."

Medical Methuselahs—and Babies

One way to avoid the pitfalls that sometimes accompany retirement is to keep on working.

Though they don't specifically credit their happy longevity to their continuing practices, four Morganfield, Ky., physicians are nevertheless still at work. Each has passed the age of 85.

Reporting a recent interview with the four—Drs. H. B. Stewart, C. B. Graves, H. B. Allen, and J. W. Conway—the Evansville (Ind.) *Press* says none has any plans for retirement, although all have whittled down their working schedules.

Practicing for a total of 223 years leads to the accumulation of some pretty impressive statistics. One is that the four physicians have delivered just about as many babies as there are persons now living in the county—1,500.

The Law and the Laboratory —A Time to Remodel

In 39 states you can will your car to a friend, your real estate to your college, or your fortune to a pet canary, but you cannot bequeath your cornea to an eye bank or your body to a medical school. "In an era when physical science knows no limits," says Dr. Lester R. Dragstedt, "biology and medical advances are thwarted by jerry-built laws which were mainly enacted before the new medical possibilities appeared."

Dr. Dragstedt is president of the National Society for Medical Research (NSMR), which is cosponsoring the first National Conference on the Legal Environment of Medical Science. The meeting will be held on May 27 and 28 on the campus of the University of Chicago, its other sponsor. Scientists, legal scholars, and religious leaders are expected to attend.

Not only does the law make difficult the procuring of cadavers and other materials for use in research in anatomy, pathology, and organ transplantation but it remains cloudy in regard to the legal rights of and responsibilities toward human beings serving in trials of new medical treatments.

Next week's conference is an outgrowth of an NSMR committee established originally to investigate shortages of cadavers for anatomic studies. Those attending will be aiming at greater feats, however, and will attempt to reach agreement on ethical standards for the experimental use of human volunteers, cadavers, and laboratory animals. In addition, the conferees will seek to develop principles for a model legal code to govern research in medicine.

Participants will include representatives of groups affected by the differing practices, decisions, and laws affecting research which, says Dr. Dragstedt, "like Topsy—have just growed."

Award for "MD International"

A television documentary film portraying physicians abroad as medical ambassadors of good will has won the broadcasting industry's top honor.

The George Foster Peabody award went last month to "MD International," which was presented over NBC in 1958 by Smith Kline & French Laboratories in cooperation with the A. M. A. The production crew recorded activities of American physicians in private, missionary, military, foundation, and government practice. Countries visited included Japan, Korea, China, India, Indonesia, Iran, Turkey, Ethiopia, France, and Guatemala. (See Medicine at Work, THE JOURNAL, Sept. 7, 1958.)

Typical of these practitioners was Dr. Albert C. Holt, who said in Bombay, "We are representing the whole medical profession in America to these people. If we fail, American medicine fails in their eyes." A. M. A. President Gunnar Gundersen expressed it this way: "World peace cannot be attained until we build peace into the hearts and minds of men. We can add new meaning to the M.D. degree—Medical Diplomacy."

Some Wit and Philosophy at a Medical Meeting

Who says that all medical presentations are humorless drones of statistics, platitudes, and trivia? Below are some sample comments from two physicians who took part in a panel discussion at the American College of Physicians meeting in Chicago a month ago. A new feature of the five-day session was that business, civic, and nonmedical professional leaders were invited.

Dr. Irvine H. Page of Cleveland:

I am often asked, "Are we getting anywhere in research on heart disease?" It's like asking, "Are you getting anywhere with women?" It all depends on what you have in mind. In terms of dollars you have already gotten far more than you should have expected, but no horse can go as fast as the money you bet on it.

Femaleness seems to be much more than sex, as many of the richer males are finding out. Femaleness seems to assure that women, less likely to develop arteriosclerosis, will inherit this earth at least.

People will not give up something for nothing. When they were told not to smoke the consumption of tobacco went up about 6%. You know what happened when Mr. Volstead told them not to drink, and I haven't noticed a reduction in the birth rate.

Dr. Henry L. Bockus of Philadelphia:

The wise man does not accept retirement. He is not disturbed by it, for his life is, if anything, richer and happier than before. Actually he has not retired; he does not talk or think retirement.

No one can actually retire the person who won't withdraw. This person will continue to learn, and, above all, to render service to others, to the community, to his profession and country.

When does a philosopher become old? What is the age of wisdom? Someone has said that early indications of aging may simply be (1) when reading the newspaper, you turn to the obituaries before the sports page; (2) in the restaurant, you look at the menu before you look at the waitress; (3) in the station, you wait for the crowded escalator instead of using the empty stairs; and (4) your party is spoiled because you keep thinking how awful you will feel the next morning.

More Than Money

The reluctance of some older people to consult physicians concerning their health problems may not be a simple matter of economics.

Although about 85% of the persons in the over-65 age group cited in a recent survey said they had had some health complaint within the previous four weeks, only one in three had seen a physician. But among the two-thirds who did not call a doctor, only 3% said they delayed because of cost.

The survey was sponsored by the Health Information Foundation. George Bugby, HIF president, hazarded a guess on another possible reason for the failure to seek medical attention. He said, "Perhaps there is a feeling on the part of many older people that visiting a doctor or a hospital is tantamount to acknowledging an inability to cope with the inevitable illnesses of old age."

Some "Firsts" and "Specials" At the Atlantic City Meeting

What will be "different" about the A. M. A. scientific program next month? Quite a few things. When the 108th annual meeting opens for an estimated 15,000 physicians and 18,000 other persons there will be a number of new cooperative efforts, covering advances both in and out of medicine. The nonmedical fields include engineering, athletics, art, military affairs, and space technology. Even within the profession 14 other medical organizations will assemble for their own meetings around the time of the A. M. A. session, June 8 through 12.

Following are some of the "firsts" and "specials" of the scientific program:

–Seven sections will hold a joint symposium on June 11 in Convention Hall on progress in the management of childbirth. Six will meet together on June 10 to discuss hepatic diseases. Never before have more than two or three sections co-sponsored an A. M. A. symposium.

–For the first time there will be full-dress symposiums on hypnosis (June 11) and on medical problems in the jet and space age (June 9). In the recent past these subjects have been presented only in individual papers.

Other outstanding symposiums include one on blood diseases June 8, on viruses June 9, on aging June 10, and on cutaneous facial disfigurement (to be discussed more thoroughly than at any previous A. M. A. meeting) June 9. To top it off, 7 of the 21 sections of the scientific assembly this year are marking their 100th anniversaries—making next month's meeting even more "special."

(Details of the entire scientific program were published in the April 18, 1959, issue of The Journal.)

Look Again, Doctor

Museums Specialize Too—For Physicians and the Public

Richard P. Pratt

The list of modern means used to offer postgraduate medical education reads like a roll call of electronics—color television, two-way FM radio, motion pictures, tape and disk recordings, and transatlantic telephone hook-ups. Exposed almost daily to these technological advances, a hardworking doctor may easily overlook one method which has survived the test of centuries—the medical museum.

No man can clearly identify its origins, but the museum has been around for a long, long time. Alexandria was founded in 330 B. C. to extend Greek culture, and one of its early public buildings housed a museum containing laboratories, dissection chambers, botanical and zoological gardens, and living quarters for philosophers.

Today's medical museums may lack the breadth of Alexandria's, but they more than make up for this in depth. Tools for professional study and research are available—often close at hand—for the physician. And for the layman bent on adding to his knowledge of health, public museums offer many opportunities.

For the public, the outlook gets brighter all the time. Rapidly disappearing are the uninspired collections of specimens, models, and artifacts formidably enclosed in poorly lighted cases. In their place are being created highly entertaining, yet still instructive, exhibits which make effective use of modern materials and techniques to present anatomic and health information in dynamic forms.

For the physician the way is not so well prepared, but the inquiring mind will discover several notable collections that help to place medicine in historic perspective and provide a wealth of material for study and research.

An outstanding museum—and one quite different from most of its contemporaries—is the Hall of Fame and its accompanying School of History of Surgery and Related Sciences in Chicago. Housed in an impressive structure facing Lake Michigan, it was conceived by Dr. Max Thorek and is sponsored by the International College of Surgeons which he founded.

Skulls and Sculpture

Here the radiologist will find an operable x-ray machine more than half a century old, and the brain surgeon may view the perforated skulls of ancient Peruvians that show evidence of cranial surgery (trephination). Rare indeed is the physician whose understanding of his profession will not be enhanced by viewing the original model of the Carrel-Lindbergh artificial heart, reports in the handwriting of Freud, Pasteur, and Curie, and the surgical instrumentation of the ages.

Imhotep, the Egyptian physician who was elevated to full godhood, is memorialized in life-size sculpture in the Hall of Immortals as are such others as Hippocrates, Galen, Paré, Harvey, Morgagni, Semmelweis, and Lister. In the Hall of Murals, landmarks in the development of surgery have been executed in oils by Count Gregorio Calvi di Bergolo. Added to these are the historical displays of some two dozen of the world's free nations which have furnished rooms with materials illustrating the medical efforts of their physicians and national contributions to the arts of medicine and surgery.

Not content with its great but passive display of the wonders of the past, the School of History and Related Sciences periodically opens the building's main floor to audiences invited to hear prominent surgeons and educators discuss medicine's past, both recent and ancient.

In Washington

As might be expected, the nation's capital is the site of at least two collections valuable to the physician bent on education—either general or specific. The museum section of the Armed Forces Institute of Pathology will celebrate its centennial in 1962. Founded soon after Virchow's publication of the revolutionary concept of cellular pathology, it was formed originally as a repository for pathological specimens used in the training of Army surgeons. Its materials are now divided into public and professional collections. A wide range of mounted pathological specimens and gross tissue is available for professional study. The museum's collection of 500 microscopes is without equal in the U. S. and traces the instrument's evolution from crude origin to present electronic form. In addition, the museum has a selection of surgical and diagnostic instruments and even postage stamps of medical interest.

Ether to X-ray

Washington's venerable Smithsonian, storehouse for many national treasures, is another repository with great appeal for the physician. Although its collections are presented primarily for lay understanding, exhibits of professional value include a Peruvian skull still bearing the Western Hemisphere's oldest example of a surgical dressing, the patent office model of the W. T. G. Morton ether inhaler, and x-ray tubes used by Roentgen and Emil Grubbe.

Most of the Smithsonian's medical and pharmaceutical items are not isolated display objects but are parts of exhibits showing the evolutionary course of the subject. The museum includes col-

History of medicine through artistic eyes. These scenes are from Hall of Fame in Chicago. Paintings, *left* to *right*, depict honoring of Lister and Pasteur, early amputation, and trephination in prehistoric Peru.

lections of medical, dental, and pharmaceutical instruments; electrocardiographs dating from Dr. Frank Wilson's earliest efforts; a display of hearing aids "from cupped hand to transistor"; and such sidelight items as an early nursing bottle shaped like a woman's breast and made of glass.

Philadelphia

In Philadelphia, the Mütter Museum of the College of Physicians has attracted both medical students and physicians. The Mütter's educational appeal is chiefly historical. It was built around the pathology collection of Dr. Thomas Mütter, whose wet specimens were given to the museum in 1863. However, its displays also include a collection of skulls—some showing ancient trephination techniques used in Peru—, dislocated and fractured bones in various stages of repair, a display of clinical thermometers, 16th century surgical instruments, and a series on the evolution of the hypodermic syringe.

The Cambridge Contribution

The Warren Anatomical Museum in Cambridge, Mass., an adjunct of Harvard University, serves as a teaching collection for the Harvard Medical School, but its curator, Dr. Paul I. Yakovlev, hopes to see it become "a memorial of medical history at Harvard." In addition to its collection of normal and pathological bones and organs of man and animals, it also owns medical curios of historic interest for physicians.

Among these are the Crowbar Skull and the phrenological collection. The Crowbar Skull is that of Phineas Gage, foreman of a rock blasting gang, who accidentally fired a powder charge which drove a 13-lb. tamping iron into his cheek and out through the top of the cranium. The survival of the victim of this 1848 accident was a cause for wonderment for almost a century until the advent of frontal brain surgery in the late 1930's.

It was in this same era that phrenology enjoyed its vogue. The Warren Museum's collection of head casts was inherited from the Boston Phrenological Society after that group's interest waned in 1842. The unusual collection is comparable only to one in Paris.

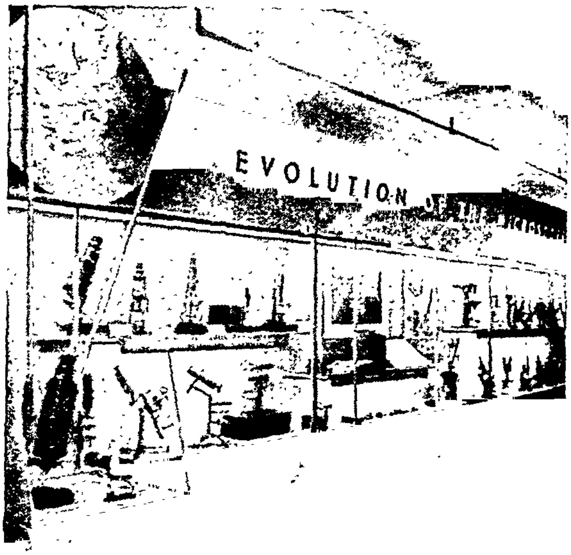


Exhibit of Armed Forces Institute of Pathology in Washington, D. C.

Mayo Foundation

As one of its many activities in Rochester, Minn., the Mayo Foundation operates a divided museum. One part serves to educate the public in matters of health; the other is a study and research collection open only to physicians, nurses, and dentists.

The professional exhibits are housed on a separate floor of the foundation's museum building and in the various hospitals. In addition to displays of medical and surgical instruments, models, photographs, and charts, the museum boasts more than 750,000 surgical and pathological specimens which are not exhibited but are available for study and research.

Education for the Public

Health museums for laymen got their start in early 20th century attempts to bridge the gap between lay and professional knowledge in Europe and Great Britain. In fact, German experts in health exhibit techniques were lured to the U. S. in the 1930's to aid in the preparation of the medical attractions which were popular at the great fairs held during that period in a number of the nation's major cities.

From these beginnings sprang the popular health museums that have emerged or are being considered in many U. S. cities. Cleveland's Health Museum was opened in 1940 with the blessing of the Academy of Medicine. In 1946, the Dallas Academy of Medicine—whose membership includes dentists, pharmacists, and hospital officials as well as physicians—sparked a drive that culminated in the Dallas Health Museum, which is maintained almost entirely by public subscription. The first

Second Life for Exhibits

Ever wonder what happens to exhibits shown at the A. M. A. Annual and Clinical meetings? Many pass into oblivion, but some graduate to the collections maintained by medical and health museums.

Refurbished and translated for nonprofessional audiences, several have been integrated into the lay collection of the Mayo Museum in Rochester, Minn. Many more are on display in the medical sections of the same museum.

One of the most popular of the technical exhibits from the 1958 meeting in San Francisco—Upjohn's giant-size model of a cell—is now on display for the hundreds of Chicagoans who visit the Museum of Science and Industry each day.

hospital to plan for and integrate a museum into its building plans was Lankenau in Philadelphia, opened to the public in 1953. Most recent addition to the museum ranks is the Kettering Foundation-sponsored Hinsdale Health Museum in Illinois, which was built in conjunction with a professional building.

Such single-purpose museums were pre-dated by a variety of health collections which were parts of general museums. These included the American Museum of Natural History in New York, the Museum of Science and Industry in Chicago, the Nebraska State Museum in Lincoln, and others in Buffalo and Toledo.

Dr. Bruno Gebhard, the pioneering curator of the Cleveland Health Museum, set the tone for the modern approach to such displays when he called them "museums, not mausoleums," a keynote that consigned poorly lighted, dust-gathering collections to oblivion and forecast the era of dynamic presentation using new methods and materials.

Models of mouths large enough to put your head into, life-size plastic body forms equipped with lighted organs and circulatory systems, tape recorded heartbeats, electrified models of the brain showing its functions, and bas-reliefs illustrating gestation from cell to child—these are the exhibits that well satisfy lay curiosity in matters of health, physiology; and bodily function and painlessly instruct in matters of natural law.

Looking Ahead

A small band of determined physicians has formed the Chicago Museum of Medical Science. As yet nothing more than a name, it was inspired by the late Dr. David J. Davis who, in 1929, wrote: "In Chicago, there should be a great medical and health museum planned in broad lines and covering every phase of historical medicine. . . . Here should be depicted the natural history of disease in all its phases, together with the efforts of man, successful and unsuccessful, to combat its ravages. . . . A medical museum properly organized, might serve the people in a medical way quite like the Art Institute serves them from the standpoint of art."

Proponents of the museum formed a nonprofit corporation in 1950 and won approval in principle from the Trustees of the American Medical Association. As described by Dr. Frederick Stenn, secretary of the group, the proposed museum would be "a treasury into and from which materials flow and are made available for loan anywhere in the country . . . a potent, vivacious, magnetic institution devoted not alone to collection and preservation, but to research and study . . . embodying the entire culture of medicine from its earliest days and pertaining to [its] every aspect."

Such a "medical visual aid institute," as it has been described by one of its backers, would search out treasures from "garret and cellar, the pawnshop, private collections, and refuse heaps." It would preserve and loan the best exhibits from medical meetings. "Every visual aid will be emphasized," says Dr. Stenn, "together with books, graphs, charts, EKG's, encephalograms, kinematograms, slides, anatomic and pathologic specimens, x-ray films, drawings, maps, photos, autographs, transparencies, models, dioramas, panoramas, statuary, coins, stamps, phonograph records, living demonstrations, models of the tonsil, larynx, esophagus, stomach, rectum, bronchus, and ear—both normal and pathologic—all seen through instruments specifically designed for their exhibition."

More Museums on the Way

The continuing public interest in health and medical history is being matched by the desire of organized medicine to help provide facilities to meet the demand.

Three decades of planning are expected to culminate next year in the opening of the Medical Museum of Wisconsin on the site of 19th century Fort Crawford at Prairie du Chien. It was here that Dr. William Beaumont performed his notable studies in digestion. Public contributions to the project will be accepted after the profession has had an opportunity to donate.

Sponsored by the State Medical Society of Wisconsin, the effort will include a restoration of the fort's military hospital and the construction of a museum building, curator's residence and workshop, and a pavilion. The *Wisconsin Medical Journal* reports plans to "discard the 'antique shop' approach, and create a series of living, changing exhibits involving dioramas, motion pictures, and periodically changing displays of an educational nature."

In Boston, meanwhile, construction of the central building of the projected $9,500,000 Museum of Science is now under way. The second of its seven floors will house the "Hall of Man, *Medicine*, and Public Health." The Medical Advisory Committee of the museum says the hall will promote public understanding of the structure and function of the human body, cite developments in the diagnosis and treatment of disease, and show in perspective the culture of man as his abilities have developed.

Aspirations such as these go hand in hand with medical progress. When man emerged from the self-imposed cultural exile of the Dark Ages, his search for knowledge resulted in "curiosity collections" of objects that intrigued but often mystified him. As he advanced—spurred by the often clandestine dissections and autopsies of the 16th century—his interest turned to anatomy and bodily function. These studies provided pathological specimens, and in the 18th century the famous Hunterian collections laid the groundwork for the modern medical museum.

And the medical museum, according to Sir Arthur Keith, former curator of the museum of the Royal College of Surgeons, is "an engine for the dissemination of culture."

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THYROID NODULES AND THE FALLACY OF "ALL OR NONE" TEACHING

GUEST EDITORIAL

George Crile Jr., M.D.

ELSEWHERE in this issue of The Journal, page 405, is presented a reasonable plan of treatment for asymptomatic thyroid nodules. The line of thought therein contrasts sharply with the opinions of some who believe (and can prove by statistics) that nodules in the thyroid are of no consequence. It contrasts also with the opinions of others who believe (and can prove by statistics) that all thyroid nodules should be removed. The author of the plan believes (and can prove by statistics) that some thyroid nodules should be removed and that others should not.

The confusion of opinions and statistics in medical teaching is not limited to nodules of the thyroid. The treatments for gallstones, gastric ulcers, and polyps of the colon also have been subjected to the "all-or-none" principle. Yet to these and to many other problems there may be reasonable clinical and statistical approaches.

Although it is not known whether gallstones cause cancer of the gallbladder or are caused by cancers of the gallbladder, it often is said that in order to prevent the development of cancer all gallstones should be removed. In patients with the type of cancer of the stomach that clinically, radiologically, and cytologically resembles a benign ulcer, it is not known whether or not a month of medical treatment reduces the chances of surgical cure, yet some advise immediate resection of all gastric ulcers because of the possible presence of cancer. Despite our ignorance of the natural history of these and other diseases, some physicians boldly urge their patients to undergo major operations for the removal of lesions that either are causing no symptoms or could be treated successfully by medical means.

The opposite extreme in teaching may be equally ill-advised. When patients who are good surgical risks have both gallstones and persistent abdominal distress, it seems unreasonable not to advise them to have the gallbladder removed. When gastric ulcers recur or do not heal completely it seems unwise to persist in medical treatment. If a patient who is a good surgical risk has a definite polyp of the colon, it seems inconsiderate to subject him to the anxiety of repeated examinations when the polyp could be removed so simply. Between these extremes the best solution must lie. The appropriateness of this middle course is nowhere more apparent than in the treatment of the thyroid nodule.

It is difficult to believe that those who urge the removal of all thyroid nodules really believe that this course should be followed as a mass-production, public-health principle. Clinically, nearly 5% of all adults have palpable nodules in their thyroids. Pathologically, almost all persons beyond middle age have nodules. The surgeons who say that all thyroid nodules should be removed mean that most of the patients who are referred to them have the type of nodules that should be removed. They sometimes forget that they are asked to examine patients with nodules of only such a special nature that they are thought to be of clinical significance.

Although the feeding of desiccated thyroid does not often cause nodular goiters to disappear or to shrink significantly, it does stop most goiters from growing larger. It is cheap and easy to take. Doses of 1 or 2 grains (60 or 120 mg.) daily usually stop the growth of goiters and cause no side-effects. If instead of treating multinodular goiters with desiccated thyroid a total thyroidectomy is performed, the patient still must take thyroid for the balance of his life. Also, if subtotal thyroidectomy is performed the patient should take thyroid permanently if he is to avoid recurrence.

In laboratory animals, administration of thyroid hormone protects against all types of experimentally induced cancer of the thyroid. In man, many cancers of the thyroid have been shown to shrink or to disappear when desiccated thyroid is given. Both laboratory and clinical evidence suggest that feeding of desiccated thyroid affords as much protection against the development of cancer of the thyroid as does any operation short of total thyroidectomy.

An experienced observer who has followed nodules of the thyroid from the operating room through the pathology laboratory usually can suspect the presence of cancer in a thyroid nodule. A young patient with a hard area of infiltration in a

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From the Department of General Surgery, The Cleveland Clinic Foundation, and The Frank E. Bunts Educational Institute, Cleveland.

lobe of the thyroid, a patient with a nodule and enlarged cervical lymph nodes, or an old patient with a hard, rapidly enlarging, infiltrating tumor should be suspected of having cancer. Soft, multinodular goiters, on the other hand, rarely are malignant.

It is dramatic to teach by generalization—to say that all thyroid nodules, all gastric ulcers, and all gallstones should be removed. Students enjoy this type of teaching; it is easy to learn. Clinical judgment, on the contrary, is hard to learn.

A physician is fortunate if in a lifetime he can study enough patients with one type of disease to attain a high order of judgment in this disease. That is why specialists are needed. The primary role of the surgical specialist in thyroid disease should not be to remove nodules, but to decide whether or not they need to be removed. The primary role of the internist specializing in thyroid disease should not be to treat thyroid nodules medically, but to decide which nodules should be treated medically and which should be removed. In decisions of this type, the judgment of well-trained surgeons and well-trained internists should be the same. Both surgeons and internists should be biologists at heart.

VENTRICULAR FIBRILLATION IN HEARTS TOO GOOD TO DIE

So much has been learned about ventricular fibrillation in recent years that in the future it may be possible to reduce its incidence. However, ventricular fibrillation is still a mystery in that it has no anatomic identity. It leaves no trace when it kills. It confuses the medical intellect by killing when it should not, when anatomic disease is mild and when life appears to be safe. It stops a good heart as readily as it does a damaged heart, in infants as well as in adults. It has no respect for sex or age. It kills with or without warning.

Nevertheless, positive gains have been made to prevent death and to restore life after ventricular fibrillation has occurred. One of the first encouraging signs came in 1899 from Prévost and Battelli, French physiologists, who described a method for the defibrillation of the heart of a cat in which a large electrode was placed on each side of the heart and an electric shock sent through the heart. The electricity made all the muscle fibers contract at the same time and when the current was broken the convulsive movements disappeared and the heart was ready to beat again. The heart of a dog is readily thrown into fibrillation by contact with an electric wire and it is just as readily defibrillated with use of the same electricity but more of it and spread over a larger area.

Cases of fibrillation and defibrillation were presented by motion picture to the American Surgical Association in 1937, along with records of patients whose hearts fibrillated during operation. The method for defibrillation also was presented. Ten years later, June 16, 1947, The Journal reported the case of the first human heart successfully shocked out of fibrillation with complete recovery. Application of the method was extended later to the wards and other parts of hospitals with success. It has been tried without success in concert halls and churches, on the roadside, and on golf courses. Regardless of where electric death occurs the requirements for success are the same.

Fibrillation of the ventricle in the human is produced by an electric charge made within the heart itself. The term "fatal heart attack" might be replaced by "self-electrocution of the heart." A checkerboard distribution of coronary artery blood produces these electric charges. They do not appear when the heart is uniformly deprived of oxygenated blood as in the "blue-baby" but when only part of the muscle is deprived of oxygenated blood as in the presence of an anomalous coronary artery. Children with anomalous coronary arteries cry out with anginal pain and die. Anginal pain and fibrillation are based on the same physiology. Generalized anoxia of the heart is tolerated even when it is severe; localized anoxia is painful and kills even when it is mild. The development of fibrillating charges is independent of an infarct. Conversion of oxygen differentials into electric charges requires further investigation. The old concept of "current of injury" implies that injury of muscle is involved when this current is produced. This concept is not valid. It implies that cyanosed muscle is injured muscle. The fact that a deeply and uniformly cyanosed heart is not injured and does not produce "current of injury" is evidence against this concept. A deeply cyanosed heart maintains electric equilibrium and while its contractions become weakened it does not fibrillate. The key point is the difference between localized anoxia and generalized anoxia.

Coronary heart disease is complex. Hearts with severe reduction in arterial inflow require more blood. Hearts in failure require better muscle. Hearts with adequate inflow but with checkerboard distribution require even distribution. These requirements dictate three approaches to treatment. The first and second are related, respectively, to structural disease in arteries and in muscle. Treatment of structural disease is a difficult research problem. The third yields to treatment by the creation of intercoronary channels. If these channels can be produced, then the treatment of this aspect of coronary heart disease will yield to that procedure which produces them. The physiology and treatment of this aspect of coronary artery disease deserve careful scientific analysis because positive steps in protection and treatment are in the realm of probability. They wait to be understood and applied.

ORGANIZATION SECTION

WOMEN'S AUXILIARY TO HOLD 36th ANNUAL MEETING

A presentation on survival medicine in national defense by Lieut. Col. Ingalls H. Simmons, M.C., will be one of the highlights of the 36th annual convention of the Woman's Auxiliary to the American Medical Association. More than 2,500 physicians' wives will attend the meeting which is being held in conjunction with the A. M. A. Annual Meeting June 8-12 in Atlantic City. Headquarters will be Hotel Haddon Hall. Colonel Simmons, who is director of the department of preventive medicine, Army Medical Service School, Fort Sam Houston, Texas, will speak Tuesday morning during the opening general meeting of the Auxiliary.

National committee meetings and round-table discussions will be held June 6-8 with formal opening of the convention slated for Tuesday morning. Business sessions on Tuesday and Wednesday will be devoted to state and national committee reports and discussions on current projects, ranging from automobile safety and community service to mental health and recruitment of medical personnel. Tuesday's luncheon in honor of Auxiliary national past-presidents will feature Aubrey Gates, Director of the A. M. A.'s Field Service Division, discussing medicine's legislative program.

During Wednesday's general meetings, Frank R. Burrows Jr., field service director of the Chicago Citizens Traffic Safety Board, will discuss the driver's responsibility in auto safety in his speech entitled, "You Can Get Blood Out of a Turnip." A report on alcoholism will be given by Dr. Marvin A. Block, Chairman of the A. M. A.'s Committee on Alcoholism, as part of the Auxiliary's mental health committee program. Speaker at Wednesday's luncheon honoring the President, Mrs. E. Arthur Underwood of Vancouver, Wash., and the President-Elect, Mrs. Frank Gastineau of Indianapolis will be Dr. Gunnar Gundersen, then immediate Past-President of the A. M. A. During this session the Woman's Auxiliary contribution to the American Medical Education Foundation will be given, and A. M. E. F. awards will be presented to the winning auxiliaries.

After the luncheon, two films will be shown: "Allied Medical Careers," produced by the Maricopa County (Arizona) Auxiliary and "Crusade for Freedom." In addition, Carol Lane of Shell Oil Company will present a demonstration on traffic safety. Election and installation of national officers will be held Thursday morning with adjournment scheduled for noon.

A postconvention workshop for national officers, directors, committee chairmen, state presidents, and presidents-elect will be held Friday morning to discuss upcoming programs and projects. Dr. Ernest B. Howard, A. M. A. Assistant Executive Vice-President, will speak on new A. M. A. activities, and George Cooley, Secretary of the A. M. A. Council on Medical Service, will discuss medicine's program on health care for the aged citizen. All Auxiliary members, their guests, and guests of physicians attending the A. M. A. Annual Meeting in Atlantic City may participate in all social functions and attend the general meetings of the Auxiliary. One of the outstanding social events will be the annual tea in honor of the Auxiliary President and President-Elect on Monday afternoon, sponsored by Pfizer and Company, a pharmaceutical firm. Local convention arrangements are under the direction of Mrs. David B. Allman of Atlantic City, General Chairman.

GOVERNMENT SERVICES

PUBLIC HEALTH SERVICE

International Fellowships.—International fellowships were awarded to 31 promising young medical scientists from Argentina, Austria, Belgium, Brazil, Chile, Colombia, Denmark, El Salvador, England, Finland, France, Germany, Holland, Peru, Sweden, Switzerland, and Uruguay. Administered by the National Institutes of Health, the program provides one year's postdoctoral medical research training in a United States institution of the recipient's own choosing. Each of the awardees holds a doctoral degree or its equivalent in one of the medical or related sciences and was formally endorsed by a committee of eminent scientists in his own country. Final selection of the recipients was made by a fellowship review board comprised of scientists at the National Institutes of Health. In operation since the beginning of 1958, this program is designed to foster the reciprocal exchange of scientific information and research techniques between the United States and foreign investigators.

Air Pollution Traineeships.—The Public Health Service has established a grants-in-aid program to increase the number, competence, and knowledge of professional personnel engaged in the prevention and abatement of community air pollution. A limited number of traineeships for training activities relating to the study of the effects, extent, assessment, or control of air pollution will be awarded to persons desirous of obtaining such specialized training and instruction during the 1959-1960 academic year.

A trainee must be a citizen of the United States or have filed a Declaration of Intent. In addition, a postdoctoral candidate must have a doctoral degree from a college or university offering a recognized degree. The regular (12 months) stipend for the postdoctoral trainee (to be prorated and paid on the basis of one-twelfth for each month of training) is $4,800. A stipend level differing from the above in cases of unusual need and on the basis of justification submitted by the applicant would be considered. An additional $360 for each legal dependent (as defined for federal income tax purposes) is allowed for a 12-month period, to be paid in equal monthly installments over the period of actual training. Stipends are not affected by a change of dependency status during the award period. Transportation costs at the rate of six cents per mile as computed by standard mileage charts are allowed to trainees between their present station and the training institution. No allowance is made for return travel, travel of dependents, or shipping charges for personal effects or household goods. Actual cost of tuition and fees will also be paid.

The traineeship is awarded for a period not to exceed 12 months. The trainee is expected to pursue a full-time training program. If support is desired for more than one year, special justification of the additional training should be furnished at the time the initial application is made. Support for additional training will, in all cases, depend on the availability of funds appropriated by the Congress for this program. The Public Health Service may terminate a grant before its expiration date on request of the trainee, on request of the training institution, or because of unsatisfactory performance, unfitness, or inability of the trainee to carry out the purposes of the traineeship. The training period must begin no later than 10 months after the date of notification of traineeship award. The award of a traineeship does not make the trainee an employee of the Public Health Service.

Applications for air pollution training grants-in-aid may be secured from any of the Regional Offices of the Public Health Service or from the Chief, Division of General Health Services, Bureau of State Services, Public Health Service, U. S. Department of Health, Education, and Welfare, Washington 25, D. C. Applicants wishing to start training during the 1959-1960 academic year should submit applications as soon as possible. Training grants will, however, be awarded as vacancies occur, and applications may be submitted at any time. Applications providing for training to start at other than the beginning of the normal academic year should preferably be submitted at least three months prior to the time the applicant wishes to begin training.

FOOD AND DRUG ADMINISTRATION

Public Warning.—*Persons who wear contact lenses* should avoid using a product called Barnes-Hind Wetting Solution, put up in 2-oz. dropper bottles by Barnes-Hind Ophthalmic Products, Inc., Sunnyvale, Calif., because it is contaminated with Pseudomonas aeruginosa, an organism which can cause blindness. The cleanser has nationwide distribution. Larger, one-pint containers are distributed to practitioners who prescribe or distribute contact lenses. The Food and Drug Administration said there would probably be no harmful effects from use in a normal, healthy eye but that dangerous infection may occur if any injury or infection is already present. Efforts are being made by the company and the government to recall outstanding stocks.

Preserving Fresh Fish.—The use of chlortetracycline to aid in keeping fresh-caught fish in sound condition was authorized by the Food and Drug Administration. The order sets 5 ppm as the maximum amount of the antibiotic that may legally remain on fresh-caught unprocessed seafood. Commercial fishermen will be allowed to use the drug on fresh-caught whole, headed, and gutted fish, shucked scallops, and unpeeled shrimp. It does not allow use of the antibiotic on processed seafood products, including fish cuts, steaks, and fillets, peeled shrimp, and shucked oysters. This drug has been used on uncooked poultry since 1955, and extensive data on its safety are available. A minute amount will remain in fresh seafood treated with the antibiotic and will not always be removed in cooking. Scientists and physicians have determined from available data and feeding tests that the prescribed amount of chlortetracycline can be consumed without harm, even to the few exceptional persons who may have developed a sensitivity to antibiotics. The law requires the labeling of treated seafood products to show that chlortetracycline has been added as a preservative. Commercial fishermen will use the antibiotic as a dip or in the ice as an aid to keeping their catch in sound condition. They may not use it in place of adequate refrigeration nor, because of its use, neglect to maintain thoroughly clean conditions aboard their boats.

Personal.—Charles G. Durbin, V.M.D., was appointed veterinary medical director of the Food and Drug Administration's bureau of medicine, succeeding the late Dr. John H. Collins. Fred J. Kingma, D.V.M., will succeed Dr. Durbin as associate veterinary medical director.

COUNCIL ON LEGISLATIVE ACTIVITIES

THE MEDICAL LEGISLATIVE DIGEST

The Medical Legislative Digest will be published about twice a month, while Congress is in session, by the Council on Legislative Activities. The purpose of the digest, which will take the place of the *Legislative Analysis* previously published by the Washington office, is to serve physicians and others who are directly concerned with or active in national medical legislative activities. The digest will include analyses of new congressional bills, reports on the status of pending medical legislation, and Association legislative activities and policies. It is suggested that copies of the digest be retained for future reference. The *A. M. A. News*, servicing the entire Association membership, will cover items of general interest on medical legislation which were formerly covered in the Washington letter. Since the purpose of the digest is to keep its readers well informed on congressional activities, suggestions for improvement will be most welcome.

Bill Analysis

Medical Expense Tax Deduction.—H. R. 6415 would amend the Internal Revenue Code in order to allow a deduction for all medicine and drugs when the taxpayer or his spouse has attained the age of 65. This bill would increase the medical deduction for taxpayers aged 65 and over. Under present law, a taxpayer in this age group, may deduct only the amount of medical expenses for medicine and drugs which exceed 1% of his adjusted gross income. The proposed law would authorize a deduction from gross income equal to the cost of all medicine and drugs if the expense incurred is primarily for the care of the taxpayer and his spouse. Representative Cramer (R., Fla.) introduced the bill April 15, 1959, and it was referred to the House Ways and Means Committee.

Study of Doctor Shortage in the United States.—H. R. 6417 would provide for the establishment of a commission to study the shortage of doctors of medicine in the United States. This bill would authorize a one-year study of the shortage of doctors in the United States. The study is to be undertaken by a 12-member group to be known as the Commission on the Doctor Shortage in the United States. Its members are to consist of two Senators, two members of the House of Representatives, two representatives from the executive branch of the government, and six members from private life. The medical profession would have representatives in the last group. The commission would give particular attention to (1) the policy of medical schools in limiting the number of student admissions; (2) the number of physicians graduated annually from medical schools in the United States; (3) the extent to which hospitals must seek foreign doctors to fill internships; (4) the number of U. S. citizens studying medicine in foreign countries who could not gain admittance to medical schools in the United States; and (5) the extent to which graduates of foreign medical schools are permitted to practice medicine in the United States.

The commission is to submit a final report to Congress not later than one year after the enactment of the Act. The report may contain recommendations and proposals for constitutional amendments, legislation, and administrative actions which in its judgment are necessary to carry out its recommendations. Representative Dorn (R., N. Y.) introduced the bill April 15, 1959, and it was referred to the Interstate and Foreign Commerce Committee.

Control of Radiation Hazards.—S. 1628 would provide for the vesting of primary responsibility for the protection of the public health and safety from radiation hazards in the Public Health Service of the Department of Health, Education, and Welfare. This bill authorizes the surgeon general of the Public Health Service to undertake research relating to radiation hazards, to make technical service available, to develop uniform standards of radiation protection, and to provide training for professional and technical personnel in matters relating to radiation hazard control. On introducing this bill the author stated that medical, industrial, and commercial use of x-ray machines and radioisotopes have increased the need for controls. The bill defines radiation hazard as "a source of ionizing radiation created or developed by man, including x-ray machines, nuclear reactors and their radioisotopic byproducts, high-energy particle accelerators, concentrated forms of naturally occurring materials, and the fallout constituents of nuclear weapons, which alone or in conjunction with other sources endangers or may endanger the public health."

After consulting with federal, state, and local agencies exercising responsibilities in connection with the control of radiation hazards, the surgeon general is to develop a comprehensive program in which he has the primary responsibility for the control and regulation of such hazards. The program

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This is in essence the May 1 issue of *Medical Legislative Digest*.

is to also include recommendations for procedures to resolve any conflicts between the surgeon general and federal agencies arising out of the discharge of their various responsibilities in this area. The program shall also include recommendations with respect to (1) the role of the states in radiation hazard controls, (2) financing of federal and state activities under the program, and (3) providing assistance to the states in the development of model laws relating to the control of radiation hazards. The program is to be set forth in a report to be submitted to Congress no later than Feb. 28, 1960, together with recommendations for legislation to implement it.

A 15-member National Advisory Council on Radiation Hazard Control would be established to advise and assist the surgeon general. He would be chairman of the council. Other members would be the chairman of the Atomic Energy Commission, the Secretary of Defense, director of National Science Foundation, and 11 members appointed by the President from state and local agencies and public or private organizations. Senator Hill (D., Ala.) introduced the bill April 8, 1959, and it was referred to the Senate Labor and Public Welfare Committee.

Legislation Identical or Similar to Bills Previously Analyzed

Bill Number	Subject	Identical or Similar to	Page
H.R. 6248	Hospitalization; nursing home care and surgical services for Social Security beneficiaries	H.R. 4700	79 (L.A.)
H.R. 6393			
H.R. 6265	Control of radiation hazards	S. 1628	2 (M.D.)
H.R. 6325	Public health and professional nurse traineeship provisions of the Health Amendments Act of 1956	S. 731	46 (L.A.)

Status of Pending Legislation

Air Pollution Control Law.—The Air Pollution Control Law, S. 441, 86th Congress, was amended and favorably reported by the Senate Committee on Public Works on April 13, 1959. Existing law provides for a five-year program (expiring June 30, 1960) with an annual appropriation of 5 million dollars. S. 441, as originally introduced, would have made the Air Pollution Control Law permanent without any limit on appropriations. The amendment to the bill prepared by the Committee on Public Works would extend the law for another four years and authorize annual appropriations up to $7,500,000.

Keogh-Simpson Hearings Soon.—The Senate Finance Committee will probably commence hearings on H. R. 10, 86th Congress, the Keogh-Simpson bill, during the latter part of May. Unfortunately, H. R. 10 reached the Senate too late in the second session of the 85th Congress last year to permit Senator Byrd, Chairman of the Senate Finance Committee, to schedule hearings. If you have not already done so it is suggested that you contact your Senators and advise them of the reasons for your support of this legislation.

A. M. A. Legislative Activities and Policies

Government Employees Health Insurance.—The statement, outlining the Association's position and recommendations concerning S. 94, 86th Congress, was submitted on April 27th to the Post Office and Civil Service Committee of the Senate. This bill, which was analyzed on page 23 of the *Legislative Analysis,* provides for a voluntary health insurance program for federal governmental employees and their dependents.

Board of Trustees Acts on Proposed Legislation.—On April 26th, the A. M. A. Board of Trustees considered the recommendations resulting from the Feb. 28, 1959, meeting of the Council on Legislative Activities. The Board voted to reaffirm its approval of the Keogh-Simpson bill (H. R. 10, 86th Congress) and similar proposals encouraging the establishment of voluntary pension plans by self-employed individuals. It also expressed approval of a bill (H. R. 2549, 86th Congress) authorizing deductions from salaries of government employees for premiums to purchase accident and health insurance contracts.

In line with previous actions taken by the Association, the Board opposed the new Forand Bill (H. R. 4700, 86th Congress) and other legislative proposals which would expand medical coverage under the Social Security Act. These bills include proposals to lower the age requirement for disability benefits and to modify the definition of permanent and total disability. Other Board actions included opposition to proposed veterans' legislation extending presumptions of service-connection for various diseases and bills which would increase governmental control over the processing, distribution, and allocation of drugs.

Chairman of Advisory Committee on Aging Appointed

Former Congressman Robert W. Kean of New Jersey has been appointed chairman of the Advisory Committee for the White House Conference on Problems of the Aging. Although the conference will not take place until January, 1961, the advisory committee will start functioning in the near future. Congressman Kean will assume his duties May 1, and the first meeting of the committee will be held around May 15, 1959.

MEDICAL NEWS

CALIFORNIA

Competitive Examination for Epidemiologist.—The Los Angeles County Civil Service Commission has announced an open competitive examination for epidemiologist (M.D.) to act as advisor and consultant to the Air Pollution Control District, the Board of Supervisors, and all agencies working against smog. Minimum requirements include graduation from an approved medical school and completion of an internship approved by the Council on Medical Education and Hospitals of the American Medical Association; three years' experience in the diagnosis and control of communicable diseases, of which one year must have been in public health work; a California State Physician and Surgeon's Certificate at time of appointment; candidates must not have reached their 68th birthday on date of appointment; they must be citizens of the United States and bona fide residents of the county of Los Angeles by the last day for filing applications. Applications are open to both men and women. For information and applications write the Los Angeles County Civil Service Commission, 501 N. Main St., Los Angeles 12.

COLORADO

Pediatric Fellowships.—The department of pediatrics of the University of Colorado Medical Center, Denver, announced the availability in 1960 and 1961 of pediatric fellowships in allergy, infectious disease, hematology, and premature and newborn nursery. Applicants should be graduates of approved schools of medicine and should have completed at least one or more years of hospital training. Preference will be given to those who are in the course of completing the pediatric hospital training required for the examination of the American Board of Pediatrics. The fellowships, for one or two years, include fundamental laboratory research and clinical investigation, as well as training in clinical diagnosis and management. Inquiries should be sent to Dr. Henry K. Silver, University of Colorado Medical Center, 4200 E. Ninth Ave., Denver 20.

CONNECTICUT

Honor Fifty-Year Physicians.—Four physicians who have completed 50 years of active membership in the Connecticut State Medical Society were honored at the annual dinner of the society April 29. The physicians are Dr. Frank L. Phillips, New Haven; Dr. Charles H. Sprague, Bridgeport; Dr. Charles L. Dichter, Stamford; and Dr. Joseph N. Perreault, Danielson. Dr. Walter I. Russell, retiring president of the society, presented service pins to the 50-year members. The honor roll for 50 years of membership includes 32 other physicians who have previously received service awards. Three women physicians are members of the group: Dr. Jessie W. Fisher, formerly of Middletown and now of St. Petersburg, Fla.; Dr. Maude W. T. Griswold, Harwinton; and Dr. Laura H. Hills, formerly of Willimantic, now of Winter Haven, Fla.

DISTRICT OF COLUMBIA

Citations for Former Interns.—Former Freedmen's Hospital Interns who have been in the practice of medicine 50 or more years, will be honored at the 37th annual meeting of the Association of Former Interns and Residents of Freedmen's Hospital, at the Howard University School of Medicine, June 2-4. Among physicians to be cited are: Dr. William C. McNeill, Washington; Dr. Milton A. Francis, Washington; Dr. Ulysses G. B. Martin, Washington; Dr. George W. S. Ish Sr., Little Rock, Ark.; Dr. Thomas Coleman, Pittsburgh; Dr. John B. Hall, Chicago; Dr. William R. Johnson, Lancaster, Pa.; Dr. Frank W. Avant, Wilmington, N. C.; and Dr. Chester A. A. Gordon, Ark, Va.

FLORIDA

Plan Medical Center Expansion.—Metropolitan Medical Center is the name chosen by the Dade County Board of Commissioners for the new buildings and facilities developing around Jackson Memorial Hospital, the teaching hospital of the University of Miami School of Medicine, Coral Gables. The center will encompass expanded hospital and medical facilities. Under a 6-million-dollar bond issue, the expansion program of the county commission includes seven new additions to existing structures, four new buildings, modernization of present buildings, and an increased capacity of Jackson Hospital itself from 900 to 1,400 beds. In addition, a large area of land adjacent to the hospital has been secured by the commission to provide sites for other facilities, including the medical school's new research and education building; the research section is already under construction, scheduled for completion by the end of the year. A Veterans Administration Hospital with a capacity of 800 beds will be built nearby, and construction is planned for a National Children's Cardiac Hospi-

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Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education, and public health. Programs should be received at least three weeks before the date of meeting.

tal, a Baptist Hospital, a Cedars of Lebanon Hospital, and an Eye Institute. New headquarters for the area Blood Bank, the Miami Cancer Institute, and the Dade County Department of Health are also part of the future center plan. Already established in the Metropolitan Medical Center network are the United Cerebral Palsy Rehabilitation Clinic and the Crippled Children's Rehabilitation Center.

Open Audiology Clinic.—An audiology clinic was opened recently by the University of Miami School of Medicine, Coral Gables. It conducts diagnostic testing, including tests for recruitment, tone decay, articulation function, social adequacy index, tests for functional hearing loss, and electrodermal response audiometry for pure tone and for speech signals. In aural rehabilitation, Otto J. Menzel, director, stated that the clinic's primary emphasis will be on hearing aid evaluation and consultation. The clinic was established with the help of funds from the Miami Hearing Society and the United Cerebral Palsy Association.

ILLINOIS

Chicago

Meeting of Hospital House Staff Alumni.—The Michael Reese House Staff Alumni Association will hold its annual reunion on Wednesday, June 3, with an open house and luncheon held at the hospital during the day and a banquet at the Furniture Club in the evening (cocktail party, 6:30 p. m.). Former house staff and present attending staff members are urged to make reservations at once by writing the Michael Reese House Staff Alumni Association, 29th Street and Ellis Avenue, Chicago 16.

LOUISIANA

Dr. Goldsmith Given Nutrition Award.—Dr. Grace A. Goldsmith, professor of medicine, Tulane University School of Medicine, New Orleans, was presented the Osborne and Mendel Award for 1959 at the annual meeting of the American Institute of Nutrition April 15. The award, established by the Nutrition Foundation, Inc., and administered through the institute, is given each year for "outstanding recent basic accomplishments in exploratory research in the science of nutrition." Consisting of $1,000 and an inscribed scroll, the award was given to Dr. Goldsmith "for her contributions in the field of macrocytic anemias, especially studies on the specific roles of folic acid and vitamin B_{12}, in the clarification of the interrelationship of tryptophan and niacin in human nutrition, and in the field of protein malnutrition."

MASSACHUSETTS

Dr. Burwell Honored.—Dr. C. Sidney Burwell, Levine Professor of Medicine at Harvard University and the Peter Bent Brigham Hospital, Boston, received the John Phillips Memorial Medal of the American College of Physicians April 22. The medal, signifying "outstanding achievement in the field of internal medicine," was presented at the college's annual meeting. Dr. Burwell is the 21st physician to be honored with the award since it was established in 1929. The award honors Dr. John Phillips, of Cleveland, former assistant professor of therapeutics, Western Reserve University Medical School, who died in 1929. Dr. Amos Christie, of Nashville, Tenn., received the Phillips Memorial Medal in 1958.

MICHIGAN

Dr. Tourtellotte Receives Neurology Award.—Dr. Wallace W. Tourtellotte, assistant professor of neurology, University of Michigan Medical Center, Ann Arbor, received the S. Wier Mitchell Award at the annual meeting of the American Academy of Neurology, April 16. The $250 award acknowledged his original work on the chemistry of cerebrospinal fluid. It is given each year to a junior member of the academy "in recognition of his accomplishments and research." Dr. Tourtellotte was one of several U-M scientists who recently analyzed the fatty content of normal spinal fluid, reportedly for the first time.

Causes of Death.—The Michigan Department of Health reported that two changes occurred among the 10 leading causes of death in Michigan during 1958. Arteriosclerosis moved up from eighth to seventh spot, changing places with immaturity, and postnatal asphyxia and atelectasis replaced cirrhosis of the liver as the 10th leading cause. Deaths in Michigan last year totaled 65,460, according to the health department's provisional figures. This was a decrease of 484 from the comparable figure for 1957. As they have for the last half century, heart diseases ranked as the leading cause of death in Michigan last year. However, deaths from this cause were 144 fewer than the previous year. Other leading diseases that caused fewer deaths in 1958 than in 1957 were strokes, accidents, pneumonia and influenza, congenital malformations, and immaturity. Cancer, the second leading cause of death again in 1958, claimed 154 more lives than in 1957. Other causes that took more lives in 1958 than in 1957 were diabetes, arteriosclerosis, and postnatal asphyxia and atelectasis.

MISSOURI

Annual Lecture.—The 1959 Leo Loeb Lectureship, sponsored by Mu chapter of Phi Beta Pi Medical Fraternity, will be held at Wohl Auditorium, Washington University School of Medicine, St. Louis, Thursday afternoon, May 28. Dr. Jonathan E. Rhoads, of the department of surgery, Hospital of the University of Pennsylvania, will speak on "Preventive Surgery in the Field of Cancer—Studies on the Justification of Risk."

Personal.—Dr. Samuel L. Aspis, manager of the Veterans Administration hospital at Poplar Bluff was named manager of the VA hospital at Kansas City, Mo. He assumed his new post April 26.—— Dr. Robert L. Jackson, chairman, department of pediatrics, was appointed chairman of the Committee on Infant Nutrition by the Food and Nutrition Board of the National Research Council. This committee is charged with the responsibility of accumulating and interpreting scientific data available, defining the unsolved problems of infant nutrition, pointing out areas for future research, and advising the National Research Council on revision of recommended dietary allowances.

NEW YORK

Conference on Residency Problems.—Physicians receiving residency training in surgery at university hospitals met at the University of Rochester School of Medicine and Dentistry, May 7-9, at the first Conference of University Surgical Residents, designed "to afford an informal opportunity to explore common problems." The conferees heard from Dr. Seymour I. Schwartz, senior instructor in surgery at the University of Rochester, and from Dr. Donald G. Anderson, dean, UR School of Medicine and Dentistry, Dr. W. J. Merle Scott, chairman, department of surgery, and Dr. Theodore I. Jones, chief surgical resident. Discussions were held on clinical problems concerning portal hypertension, peptic ulcer and esophagitis, acute abdomen and pancreatitis, management of shock and trauma, and carcinoma and transplantation. A round-table discussion was held on the problems of surgical residency training at university hospitals.

Personal.—Dr. Robert L. Brown was appointed an assistant dean of the University of Buffalo School of Medicine. From 1952 until 1954, Dr. Brown served as director of professional services, The Armour Laboratories, Chicago. Recently, Dr. Brown was the medical and technical director for the Arner Co., Inc. of Buffalo.——Dr. Louis E. Daily, Norwich Pharmacal Company vice-president in charge of its Eaton Laboratories division, was named as a member of the Department of Defense advisory panel on medical sciences by Herbert F. York, Ph.D., director of defense research and engineering. The 21 civilian consultants appointed to the panel will provide advice on research, development, and engineering aspects of the defense program in the fields of aviation medicine, atomic medicine, psychiatry, and other pertinent medical sciences. Dr. Richard A. Kern, Temple University School of Medicine, is chairman of the panel.

New York City

Memorial Lecture.—The 23rd Adam M. Miller Memorial Lecture at the State University of New York Downstate Medical Center in Brooklyn was delivered April 20 by Dr. Charles S. Davidson, associate professor of medicine, Harvard Medical School, Boston. Dr. Davidson spoke on "The Mechanism of Death in Cirrhosis."

Dr. Horecker Appointed Department Chairman.—Bernard L. Horecker, Ph.D., was appointed professor and chairman of the department of microbiology of New York University College of Medicine. He succeeds Alwin M. Pappenheimer Jr., Ph.D., who became chairman of tutors of the department of biological chemistry at Harvard Medical School, Boston. Dr. Horecker came to NYU from the National Institute of Arthritis and Metabolic Diseases of the National Institutes of Health, where he was chief of the Laboratory of Biochemistry and Metabolism (1956-59).

NORTH CAROLINA

Grant for Program in Heart Research.—Bowman Gray School of Medicine, Winston-Salem, has been awarded a $568,480 grant by the National Institutes of Health to establish a program for training scientists in heart research. The grant, made by the Training Grants Section, National Heart Institute, Bethesda, Md., covers five years. Of the total, $260,000 will provide yearly stipends for trainees in all levels of the program. Purpose of the program is to prepare men and women for academic careers in all phases of cardiovascular research and teaching. It will be directed by a 10-man faculty committee headed by Dr. Harold D. Green, chairman, department of physiology and pharmacology. The departments of physiology and pharmacology, medicine, surgery, and radiology will have major roles; other departments will assist. Each trainee will be required to follow the complete program with some details individualized according to needs. The courses will include a broad survey of current cardiovascular knowledge, basic training in experimental techniques, participation in current research projects progressing to individual projects, and experience in "good teaching techniques." Trainees will work in all allied techniques and scientific disciplines, including anatomy, embryology, biochemistry, pathology, physiology, pharmacology, medicine, surgery, and radiology. Courses will be open to graduate physicians, holders of the Ph.D. degree who wish to specialize in the cardiovascular field, holders of the master's degree who are candidates for the Ph.D. degree, medical students who wish to drop out of medical school after the second year and resume their regular medical course later, and certain candidates for the master's degree.

OHIO

Dr. Sabin Named Award Recipient.—Dr. Albert B. Sabin, professor of research pediatrics, University of Cincinnati College of Medicine, and developer of an oral polio vaccine now undergoing tests, received the 1959 Howard Taylor Ricketts Memorial Award of the University of Chicago. Dr. Jonas Salk won the award in 1957. Dr. Sabin also is chief of the division of infectious diseases at the Children's Hospital Research Foundation in Cincinnati. He was invited to the University of Chicago campus June 29 to accept the award. The title of his Ricketts Lecture is "Oral Immunization Against Poliomyelitis with Live Attenuated Polioviruses—Developmental Problems, Present Status and Future Possibilities."

PENNSYLVANIA

Alumni Meeting in Atlantic City.—Dr. Gerald S. Backenstoe, 500 Chestnut St., Emmaus, Pa., has announced that the "University of Pennsylvania, Class of 1927M, will hold a reception and dinner Tuesday, June 9, 6 p. m., in the Jerry Backenstoe Suite, Shelburne Hotel," Atlantic City.

VIRGINIA

Conferences on Child Psychiatry.—Lectures and conferences in the fields of child psychiatry and child neurology were planned by professors in residence at the Lynchburg Training School and Hospital, Colony. Four such lectures were conducted Jan. 29-31. Subsequent speakers and lecture dates are as follows:

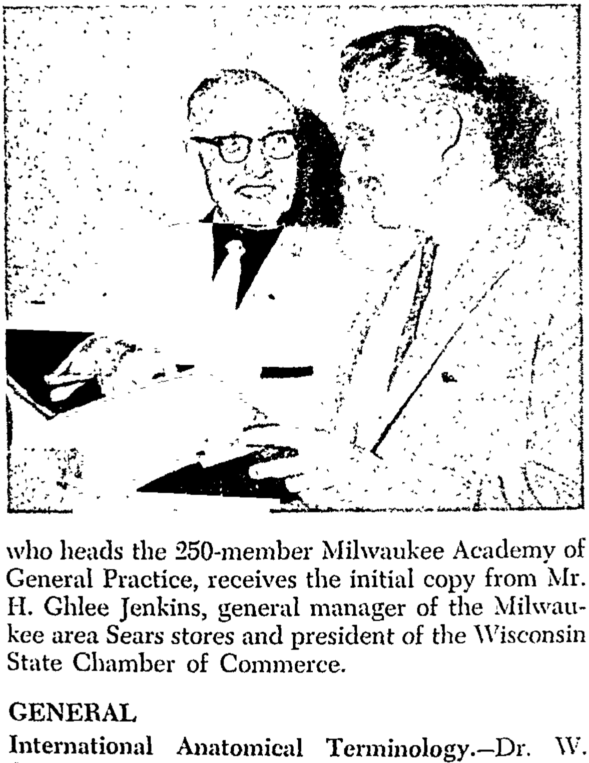
May 28-30, "Child Psychiatry," Dr. Wilfred C. Hulse, New York City.
July 30-Aug. 1, "Child Neurology," Dr. Walter O. Klingman, Galveston, Texas.
Sept. 24-26, "Child Psychiatry," Dr. Frederick H. Allen, Philadelphia.
Oct. 29-31, "Child Neurology," Dr. Sidney Carter, New York City.
Nov. 19-21, "Child Neurology," Dr. Paul M. Ellwood Jr., Minneapolis, Minn.

For information and registration write Mr. Arve Lee, Administrative Service Director, Lynchburg Training School and Hospital, Colony, Va.

WISCONSIN

Campaign for Medical Library.—A drive to solicit $600,000 from business and industry toward a new $850,000 medical library on the University of Wisconsin campus at Madison was launched by the University of Wisconsin Medical Alumni Association. The library will bear the name of former medical dean Dr. William S. Middleton, chief medical officer for the Veterans Administration, Washington, D. C. The special gifts drive was sanctioned by the University of Wisconsin and by the U. W. Foundation. Medical alumni already have raised some $200,000 from a national membership of more than 4,000 doctors and technicians, according to Dr. Mischa J. Lustok, Milwaukee, alumni general chairman. The campaign's general committee, headed by Mr. F. James Sensenbrenner, Milwaukee, includes the following: Dr. Einar R. Daniels, Milwaukee, president of the U. W. Medical Alumni Association; Dr. Abraham A. Quisling, Madison, president-elect of the U. W. Medical Alumni Association; Dr. Lustok; Dr. Albert G. Martin, Milwaukee, industrial chairman, medical alumni fund drive; and Dr. John Z. Bowers, Madison, dean of the University of Wisconsin Medical School.

Booklet on Business Aspects of Practice.—"The Business Side of Medical Practice," a 50-page booklet, will be presented to each family doctor in the Milwaukee area by the American Medical Association, in conjunction with the Sears-Roebuck Foundation. Here Dr. Stanley W. Hollenbeck, right, who heads the 250-member Milwaukee Academy of General Practice, receives the initial copy from Mr. H. Ghlee Jenkins, general manager of the Milwaukee area Sears stores and president of the Wisconsin State Chamber of Commerce.



GENERAL

International Anatomical Terminology.—Dr. W. Compere Basom, El Paso, Texas, in his paper on "Nomina Anatomica" presented at the Orthopedic Conference in New Orleans in January, said that this nomenclature is based more or less on the Basle Nomina Anatomica of 1895. The International Anatomical Nomenclature Committee published a revised "Nomina Anatomica" in 1956. In the original form the B. N. A. list of terms amounted to about 5,600. The new list numbers 5,640.

Dermatologists Meet in Atlantic City.—The 79th annual meeting of the American Dermatological Association, Inc., will be held June 1-4 at the Claridge Hotel, Atlantic City, N. J. A total of 28 papers are scheduled for presentation at the four scientific sessions. The presidential address, "The Dermatologist's Contribution to the Progress in Medicine," will be given by Dr. J. Lamar Callaway, Durham, N. C., to open the meeting. An awards presentation will close the meeting. For information write Dr. Wiley M. Sams, 25 Southeast Second Ave., Miami, Fla., Secretary.

Meeting on Investigative Dermatology.—The 20th annual meeting of the Society for Investigative Dermatology, Inc., will be held June 6-7 at the Ritz-Carlton Hotel, Atlantic City, N. J. A total of 37 papers are scheduled for presentation at four sessions. The presidential address, "Skin Cancer and Basic Research in Dermatology," by Dr. Hermann Pinkus, Monroe, Mich., will open the scientific sessions. Business and executive sessions will precede the morning programs. The dinner will be held June 6, 7 p. m. For information, write Dr. Herman Beerman, 255 S. 17th St., Philadelphia 3, Secretary-Treasurer.

British Psychiatrist Wins Award.—Dr. Maxwell S. Jones, Surrey, England, is the eighth winner of the American Psychiatric Association's $1,000 Isaac Ray Award, given annually to a psychiatrist or member of the bar "for furthering understanding between the two professions." As recipient, Dr. Jones will deliver a series of lectures on psychiatry and the law at George Washington University, Washington, D. C., in the next academic year under the joint auspices of the university's law and medical schools. Dr. Jones directs the Social Rehabilitation Unit at Belmont Hospital in Sutton. Since 1949 he has been on the Council of the Institute of Human Relations at Tavistock Clinic in London. The Award commemorates Dr. Isaac Ray, a founder of APA.

New Science Foundation Publication.—The National Science Foundation, Washington 25, D. C., published its first bimonthly issue of *Science Information News* for February-March. It was designed "to meet the need for reporting and exchanging news of worldwide activities in science communication and documentation." It is planned to develop the periodical so that it will provide service to all groups working in the various disciplines of science information. Although the first issue is slanted toward National Science Foundation activities, it is expected that most of the news will be material contributed by readers in later issues. Mr. Burton W. Adkinson is the head of the Office of Science Information Service, National Science Foundation.

Meeting of Tuberculosis Physicians.—The annual meeting of the American Academy of Tuberculosis Physicians will be held June 6 at the Ritz-Carlton Hotel, Atlantic City, N. J., with Dr. Marcio M. Bueno, New Bedford, Mass., president of the academy, presiding. A total of 19 papers are scheduled for presentation at the morning and afternoon sessions. At the luncheon session, the guest speaker will be Lt. Col. Stephen J. Berte, M.C., U. S. Army, Phoenixville, Pa., who will present "Experiences with Drug Combinations of High Dosages of INH, Daily SM, PAS, and Pyridoxine: An Evaluation of Clinical Results, the Recovery of Tubercle Bacilli from Resected Lung Specimens and Drug Toxicity Data." The presidential address at the luncheon session will be followed by the presentation of awards.

Endocrine Society Meeting.—On June 4-6 The Endocrine Society will hold its meeting at Chalfonte-Haddon Hall, Atlantic City. A total of 93 papers will be presented under the following section titles:

Thyroid.
Adrenal Cortical Syndromes—Steroid Metabolism.
Parathyroids: Pituitary Adrenal System.
Anterior Pituitary.
Estrogens and Androgens.
Pituitary Hormones—Neuroendocrine Mechanism.
Adrenal Gland.
Insulin and Diabetes.

Seventy-six papers will be read by title. The annual dinner will be held at Haddon Hall Hotel at which the presidential address will be given by Dr. E. Perry McCullagh. For information write Dr. H. H. Turner, 1200 N. Walker St., Oklahoma City, Okla., Secretary.

Rise in Traffic Deaths.—The National Safety Council reported that there was a 9% increase in March traffic deaths. The council said that meant 2,790 died in highway mishaps in March this year as compared with 2,560 fatalities for the same month last year. It was the third consecutive month to bring an increase after two years of almost unbroken reductions. The March figure brought the total for the first quarter of the year to 8,080—up 5% from last year's first quarter toll of 7,690. Disabling injuries in the first three months of 1959 were estimated by the council at 300,000. For three months, the council report showed deaths down in 16 states and up in 30, with three unchanged. Cities had a 2% increase in March, according to reports from 693 cities of more than 10,000 population. For three months, these cities showed a 3% increase from last year.

Chest Physicians Convene in Atlantic City.—The 25th annual meeting of the American College of Chest Physicians will be held June 3-7. The Silver Anniversary Convocation will be held the night of June 4. Postgraduate seminars on heart and lung diseases will be presented June 3. Round-table luncheons and "fireside conferences" are arranged, the latter to include the following foreign participants: Jose F. Valiente, San Salvador, El Salvador; Alberto Chattas, Cordoba, Argentina; Miguel Jimenez, Mexico City, Mexico; Leopoldo Molinari B., Lima, Peru; Mauricio Teichholz, Rio de Janeiro, Brazil; Carlos Zurita Gonzalez, Cabra de Cordoba, Spain. Three panel discussions are planned on "Treatment of Fungus Infections with Particular Reference to the Newer Therapeutic Agents," "Air Transport of Patients with Respiratory Disease," and "The Heart in Pulmonary Disease." Five symposiums are planned under the following titles:

Bronchogenic Carcinoma.
Pulmonary Tuberculosis.
Emphysema, Function Tests and Respiratory Aids.
Esophagus.
Primary Arterial Hypertension.

The annual president's banquet is planned for June 6, 7:30 p. m. Technical exhibits and a motion-picture program are arranged. A program of ladies' activities is planned. For information, write Mr. Murray Kornfeld, 112 E. Chestnut St., Chicago 11.

Cardiology Meeting in Philadelphia.—The eighth annual convention of the American College of Cardiology will be held May 25-29 at the Benjamin Franklin Hotel, Philadelphia, under the presidency of Dr. George W. Calver, Washington, D. C. The scientific sessions will include the following symposiums and moderators:

Some Cardiovascular Aspects of Space Medicine, Capt. Ashton Graybiel, M.C., U.S. Navy, Pensacola, Fla.
Biopathophysiology of Arteriosclerosis, Dr. E. Grey Dimond, Kansas City, Kan.
New Advances in the Radiologic Diagnosis of Heart Disease, Dr. Robert P. Glover, Philadelphia.
Use and Abuse of Cardiac By-Pass, Dr. J. Maxwell Chamberlain, New York City.
Management of Complications Attendant to Cardiac Surgery, Dr. Osler A. Abbott, Atlanta, Ga.
Recent Advances in Clinical Auscultation of the Heart, Dr. W. Proctor Harvey, Washington, D. C.
Phonocardiography and Chest Wall Vibrations, Dr. Aldo A. Luisada, Chicago.
Present and Future of Cineangiocardiography, Dr. Israel Steinberg, New York City.

The convention guest lecture will be given by Tage Astrup, Ph.D., Carlsbergfondets Biologiske Institut, Copenhagen, Denmark, the afternoon of May 28. Fireside conferences, a medical motion picture program, and scientific and technical exhibits are planned. The annual banquet will be held May 28, 7 p. m.

Congress on Rheumatic Diseases in Washington, D. C.—The second Pan-American Congress on Rheumatic Diseases will be held June 2-6 in Washington, D. C., under the auspices of the Pan-American League Against Rheumatism and organized by the Pan-American Committee of the American Rheumatism Association. Dr. Floyd S. Daft, director, National Institute of Arthritis and Metabolic Diseases, will open the meeting with an address. The official languages will be English, Portuguese, and Spanish. A total of 91 papers will be read at the plenary and concurrent sessions, with 74 papers to be read by title. Two panel discussions are planned: "Natural History of Rheumatic Fever" and "Variants of the Rheumatoid Syndrome," moderated by Drs. Gene Stollerman, Chicago, and Currier McEwen, New York City, respectively. Registration fee is $15, with service personnel and medical students, interns, and residents admitted free. For information, write Dr. Edward F. Hartund, 580 Park Ave., New York 21, Secretary.

Prevalence of Poliomyelitis.—According to the National Office of Vital Statistics, the following number of reported cases of poliomyelitis occurred in the United States, its territories and possessions in the weeks ended as indicated:

	April 25, 1959		April 26, 1958
Area	Paralytic Type	Total Cases	Total
New England States			
Maine	..	..	..
New Hampshire	..	..	..
Vermont	..	..	..
Massachusetts	..	..	..
Rhode Island	..	..	..
Connecticut	..	..	..
Middle Atlantic States			
New York	2	4	..
New Jersey	..	..	..
Pennsylvania	..	..	..
East North Central States			
Ohio	1	1	..
Indiana	..	..	1
Illinois	..	..	..
Michigan	..	..	1
Wisconsin	..	..	..
West North Central States			
Minnesota	..	..	..
Iowa	..	..	..
Missouri	1	1	..
North Dakota	..	..	..
South Dakota	..	..	..
Nebraska	..	..	..
Kansas	..	1	1
South Atlantic States			
Delaware	..	..	..
Maryland	..	..	..
District of Columbia	..	..	..
Virginia	..	..	..
West Virginia	..	..	..
North Carolina	..	..	..
South Carolina	1	1	..
Georgia	..	..	..
Florida	1	3	1
East South Central States			
Kentucky	..	..	3
Tennessee	..	..	1
Alabama	..	..	..
Mississippi	1	1	1
West South Central States			
Arkansas	..	..	..
Louisiana	1	1	..
Oklahoma	..	..	..
Texas	1	1	4
Mountain States			
Montana	..	..	..
Idaho	..	..	..
Wyoming	..	..	..
Colorado	..	..	..
New Mexico	..	..	..
Arizona	..	..	..
Utah	..	..	..
Nevada	..	..	..
Pacific States			
Washington	..	..	..
Oregon	..	..	..
California	4	5	1
Alaska	..	..	..
Hawaii	1	1	2
Puerto Rico	..	..	..
Total	14	20	16

Meeting on Legal Medicine.—The American Board of Legal Medicine, Inc., will hold its annual convention meeting at The Hotel Senator, South Carolina Ave., Atlantic City, N. J., Sunday, June 7, 9:30 a. m. The scientific papers, presented exclusively by members, are:

Medicolegal Aspects of Intervertebral Disk, Dr. Mortimer D. Abrashkin, Miami Beach, Fla.
Atomic Energy and the Law, Dr. Theodore W. Bisland, Dallas, Texas.
Medicolegal Aspects of Drunken Driving, Dr. Glenn W. Bricker, Levittown, Pa.
Medicolegal Role of the General Physician, Dr. Arthur H. Coleman, San Francisco.
Air Pollution and the Law, Dr. Sidney I. Franklin, Cleveland.
Space Medicine and the Law, Dr. George A. Friedman, New York City.
Arthritic Aggravation and Trauma, Dr. Louis J. Gelber, New York City.
Medicolegal Aspects of Myelography, Dr. Reuben Leass, Far Rockaway, N. Y.
Evaluation of Disability, Dr. Frank E. Leder, New York City.
Back Pain and Retarded Healing, Dr. Harold Lefkoe, Philadelphia.
Trends in Hospital Liability, Dr. Charles U. Letourneau, Chicago.
Medicolegal Aspects of Senility, Dr. Gustav Machol, Brooklyn.
Liability for Prenatal Injury, Dr. Harold W. Mayberger, Syosset, N. Y.
Medicolegal Aspects of Trauma to Chest, Dr. Jack Reiss, Coral Gables, Fla.
Should Your Patient Drive a Car?, Dr. Edward R. Richter, Lawrence, N. Y.
Urologist in Liability Field, Dr. Benjamin M. Shure, Brooklyn.

All interested persons are invited. There is no registration fee; register by writing to Secretary, Dr. George A. Friedman, 133 E. 58th St., Suite 410, New York 22.

CANADA

Dr. Cameron Receives Psychiatric Award.—Dr. Donald E. Cameron, of McGill University, Montreal, president of the Canadian Psychiatric Association and the past-president of the American Psychiatric Association, is the 1959 recipient of the $2,500 Samuel Rubin Award for outstanding achievements in mental health. The award was presented to Dr. Cameron April 17, by Dr. Paul R. Hoch, New York State commissioner of mental hygiene, and the first recipient of the award in 1957. Dr. Cameron was selected for the award by a professional committee under the chairmanship of Dr. Lewis R. Wolberg, dean of the Postgraduate Center for Psychotherapy, New York City. Dr. Cameron, who was born and educated in Scotland, was professor of neurology and psychiatry at Albany Medical College before going to McGill University in 1943 as chairman of the department of psychiatry.

Meeting of Biological Societies.—The second annual meeting of the Canadian Federation of Biological Societies will be held at the University of Toronto, Ontario, June 9-11. The program is arranged under the following section titles:

Adrenaline and Noradrenaline; Gross Anatomy and Histology; Toxicology; Biochemistry and Physiology; Circulation and Respiration; Histology and Embryology; Carbohydrates; Cancer; Cardiorespiratory and Environmental Physiology; Nutrition; Renal and Gastrointestinal Physiology; Nervous System and Muscle; Biochemistry; Biochemistry and Neurochemistry; Cholesterol Metabolism; Enzymes; Pharmacology; Endocrines; and the Biological Effects of Ionizing Radiation.

Business meetings for the Canadian Physiological Society, Pharmacological Society of Canada, Canadian Association of Anatomists, and Canadian Biochemical Society will be held the afternoon of June 10. A program of teaching films and exhibits are planned. For information write Dr. E. H. Bensley, Room 710, Montreal General Hospital, Montreal 25, Que., Canada.

LATIN AMERICA

Zoonoses Center in Argentina.—The Pan American Sanitary Bureau officially inaugurated its Pan American Zoonoses Center in Azul, Argentina April 25. The center, dedicated exclusively to studying the diseases transmitted between animals and man, is 185 miles south of Buenos Aires, in the province that shares the Argentine capital's name. It is administered by the bureau and financed by the Pan American Health Organization, the bureau's executive organ, and by technical assistance funds from UN/WHO and the Organization of American States. Dr. Benjamin Blood is director of the zoonoses center. In 1956 an agreement was signed between the Argentine Government and the Pan American Health Organization providing for establishment of the center and naming Azul as its site. The bureau is the world's oldest international health organization. It serves as WHO's Regional Office for the Americas.

FOREIGN

International Cytology Conference.—An International Cancer Cytology Conference, sponsored by the Instituto de Oncologia and the Ministry of Health, Madrid, Spain, the International Union Against Cancer, and the Pan American Cancer Cytology Society, will be held in Madrid, Sept. 22-26, 1960. President of the Conference is Dr. Julian Sanz Ibanez, director of the Madrid National Cancer Institute, and vice-presidents are Dr. James E. Ayre, Miami, Fla., Dr. Edmund V. Cowdry, of St. Louis, and Dr. J. Maisin, Louvain, Belgium. Dr. Angel Valle Jimenez has been appointed secretary general and Dr. Pierre-Hubert deWatteville of Geneva, Switzerland, is general program chairman. Representing the U. S. on the Advisory Council are

Dr. Alexander Brunschwig, Dr. Morris Fishbein, Dr. Ralph W. Jack, Dr. Locke L. Mackenzie, Dr. George O. Gey, Dr. Leonell C. Strong, and Dr. Richard W. TeLinde. The conference will focus world attention on cytology research and advanced methods of cancer control through early cytology diagnosis. For information, write the Pan American Cancer Cytology Society, P. O. Box 633, Coral Gables, Fla.

Section Meetings for Surgeons.—The International College of Surgeons announced the scheduling of 11 section meetings in Europe, Asia, and South America, with places and dates as follows: Thailand Section, Bangkok, May 21; German Section and German-speaking Federation, Hamburg, June 1-3; French Section, Lyons, June 19-21; The Netherlands Section, Amsterdam, July 25-26; Finnish Section, Helsinki, Aug. 8-9; Austrian Section, Vienna, Aug. 19-20; Brazilian Section, Santos, in September; China–Hong Kong Section, Hong Kong, Oct. 30; Thailand Section, Bangkok, Nov. 2; China–Formosa Section, Taipei, Taiwan, in December; India Section, Jaipur, Rajasthan, in December. For information, write to the Secretariat, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10.

EXAMINATIONS AND LICENSURE

MEDICAL SPECIALTY BOARDS

American Board of Anesthesiology: *Written.* Various locations, July 8, 1960. Final date for filing application is January 8. Sec., Dr. Forrest E. Leffingwell, 217 Farmington Ave., Hartford 5, Conn.

American Board of Dermatology: *Written. Several Cities,* Oct. 5. *Oral.* Oklahoma City, Jan. 15-18, 1960. The final date for filing all applications is July 1, 1959. Sec., Dr. Beatrice M. Kesten, One Haven Ave., New York 32.

American Board of Internal Medicine: *1959 Schedule—Written,* Oct. 19. Final date for filing application was May 1. *Oral.* For candidates on the West Coast, Portland, Ore., Sept. 9-12. Final date for filing application was March 1. *Oral.* For candidates on the East Coast, Nov. 6-7, 9-10. Final date for filing application was March 1. Sec.-Treas., Dr. William A. Werrell, One West Main St., Madison 3, Wis.

American Board of Neurological Surgery: Examination given twice annually, in the spring and fall. In order to be eligible a candidate must have his application filed at least six months before the examination time. Sec., Dr. Leonard T. Furlow, Washington University School of Medicine, St. Louis 10.

American Board of Obstetrics and Gynecology: Applications for certificates, new and reopened, Part I, and requests for re-examination Part II are now being accepted. All candidates are urged to make such application at the earliest possible date. Deadline date for receipt of applications is August 1, 1959. No applications can be accepted after that date. Sec., Dr. Robert L. Faulkner, 2105 Adelbert Road, Cleveland 6, Ohio.

American Board of Ophthalmology: *Oral.* Philadelphia, June 2-6; St. Louis, Oct. 6-10. *Written.* January 1960 in various cities. Applications for the 1960 written examination must be filed before July 1. Sec., Dr. Merrill J. King, Box 236, Cape Cottage Branch, Portland, Maine.

American Board of Orthopaedic Surgery: *Part II.* Chicago. Jan. 19-21, 1960. The deadline for the receipt of application is Aug. 15, 1959. Sec., Dr. Sam W. Banks, 116 South Michigan Ave., Chicago 3.

American Board of Otolaryngology: *Oral.* Chicago, Oct. 5-9. Final date for filing application was April 1. Sec., Dr. Dean M. Lierle, University Hospitals, Iowa City.

American Board of Pediatrics: *Written.* January 1960. Exec. Sec., Dr. John McK. Mitchell, 6 Cushman Road, Rosemont, Pa.

American Board of Physical Medicine and Rehabilitation: *Written, Part I,* and *Oral, Part II.* Philadelphia, June 12-13. Final date for filing application was February 15. Sec., Dr. Earl C. Elkins, 200 First St., S. W., Rochester, Minn.

American Board of Plastic Surgery: *Oral and Written.* Miami, Fla., Oct. 15-17. Final date for submitting case reports is July 1. Corresponding Secretary, Miss Estelle E. Hillerich, 4647 Pershing Ave., St. Louis 8, Mo.

American Board of Proctology: *Oral and Written.* Philadelphia, September. Final date for filing application was March 15. Sec., Dr. Stuart T. Ross, 520 Franklin Ave., Garden City, N. Y.

American Board of Psychiatry and Neurology: Chicago, Oct. 19-20; New York, Dec. 14-15; San Francisco, Mar. 14-15, 1960. Training credit for full time psychiatric and/or neurologic assignment in unapproved military programs or services between the dates of Jan. 1, 1950 and Jan. 1, 1954 was terminated on Jan. 1, 1959. Sec., Dr. David A. Boyd, 102-110 Second Ave. S. W., Rochester, Minn.

American Board of Radiology: *Examination.* Chicago, June 2-4. The deadline for filing applications was April 1. Washington, Dec. 6-9. Deadline for filing application is July 1. Candidates examined in Diagnostic Roentgenology may expect to be examined in Physics. A Special Examination in Nuclear Medicine (for diplomates in Radiology or Therapeutic Radiology) will not be given in June 1959. Candidates desiring this examination will be accommodated at the meeting of the Board in Washington, D. C. on December 5. Deadline for filing application is August 1. Sec., Dr. H. Dabney Kerr, Kahler Hotel Bldg., Rochester, Minn.

American Board of Surgery: *Written* examinations (Part I) will be held on December 2, 1959 at various centers to be announced later. Candidates are urged to apply several months before completion of training requirements although the closing date for filing applications is August 1. Those completing training requirements after September 30 cannot be considered for the Part I examination in December of the same year. *Part II.* Columbus, Ohio, May 14-15. Sec., Dr. John B. Flick, 1617 Pennsylvania Blvd., Philadelphia 3.

Board of Thoracic Surgery: *Written.* Various centers throughout the country, September 1959. Final date for filing application is July 1. *Oral.* September. Final date for filing application is July 1. Sec., Dr. William M. Tuttle, 1151 Taylor Ave., Detroit 2, Mich.

American Board of Urology: *Written.* Approximately 25 cities throughout the country, December 4, 1959. *Oral-Clinical* and *Examination in Pathology.* Chicago, February 1960. Final date for filing application is Sept. 1, 1959. Sec., Dr. William Niles Wishard, 30 Westwood Rd., Minneapolis 26, Minn.

DEATHS

Adams, Walter Anderson Ⓜ Chicago; Howard University College of Medicine, Washington, D.C., 1926; assistant clinical professor of psychiatry, Chicago Medical School; fellow of the American Psychiatric Association; at one time practiced in Cleveland, where he was on the staff of the Lakeside Hospital; joint author of "Color and Human Nature"; associated with the Provident Hospital; on the courtesy staff of the Michael Reese Hospital, where he died March 7, aged 58.

Aud, Guy Ⓜ Louisville, Ky.; born Aug. 29, 1887; University of Louisville Medical Department, 1909; past-president and vice-president of the Kentucky State Medical Association; past-president of the Jefferson County Medical Society; in 1950 was presented with a medallion from the American Cancer Society for "distinguished service in cancer control," the first Kentucky doctor to receive the medallion; formerly chairman of the state executive committee of the Kentucky Division, American Cancer Society, and was regional medical director for fourteen Southeastern states for the society and a member of its national board of directors; in 1956 elected an honorary life member of the board of directors of the American Cancer Society, of which he was past-president; member of the founders group of the American Board of Surgery; member and formerly vice-president of the Southern Surgical Association; fellow of the American College of Surgeons; served as a member of the Southern Medical Association, Medical Research Commission of the State of Kentucky, Kentucky Surgical Association, and Phi Chi; veteran of World War I; surgical consultant to medical examining board, Selective Service Board from 1942 to 1946, and in 1947 received the Congressional Selective Service Medal; received a citation from the University of Louisville School of Medicine for 34 years of outstanding service; joined the faculty in 1915 and was professor emeritus of surgery; from 1911 to 1915 fellow in surgery at the Mayo Clinic in Rochester, Minn.; attending surgeon, Louisville General Hospital, St. Joseph Infirmary, and Kosair Crippled Children's Hospital; contributor of chapters in Cyclopedia of Medicine, Surgery, Specialties; resigned in September, 1958, as editor of the *Journal of the Kentucky State Medical Association;* died in St. Joseph Infirmary Feb. 27, aged 71.

Barclay, Robert Donaldson, Brookfield, Ill.; Dearborn Medical College, Chicago, 1904; for many years resident physician at the British Old Peoples Home; served on the staff of the Argo (Ill.) Hospital; died Feb. 4, aged 88.

Bigger, John Dinsmore, Bradenton, Fla.; University of Kansas School of Medicine, Kansas City, Kan., 1911; for many years a medical missionary in Korea; died Feb. 12, aged 77.

Blackwelder, Robert Guy, Hopkinsville, Ky.; Medical College of Virginia, Richmond, 1932; also a graduate in pharmacy; fellow of the American Psychiatric Association; superintendent of the Western State Hospital; formerly associated with the Huntington (W. Va.) State Hospital, Eastern Shore State Hospital in Cambridge, Md., and the Southwestern State Hospital in Marion, Va.; in 1956 appointed superintendent of the Andrew S. Rowan Memorial Home at Sweet Springs, W. Va.; died Feb. 1, aged 58.

Brand, George Douglas, St. Paul; Northwestern University Medical School, Chicago, 1917; certified by the National Board of Medical Examiners; veteran of World War I; died in New Britain (Conn.) General Hospital Feb. 23, aged 66.

Bresee, Paul H., Los Angeles; University of Southern California College of Medicine, Los Angeles, 1892; served on the staffs of the Hospital of the Good Samaritan and Angelus Hospital; died Feb. 5, aged 87.

Bridges, William Arthur Ⓜ Lutherville, Md.; University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore, 1915; member of the American Trudeau Society; served as medical superintendent of the Eudowood Sanitarium in Towson, where he died Feb. 23, aged 78.

Brown, Thomas Ponder Ⓜ Thomasville, Ga.; University of Georgia Medical Department, Augusta, 1914; veteran of World War I; died Feb. 22, aged 78.

Bouvy, Leo Benedict Ⓜ La Grande, Ore.; University of Pennsylvania School of Medicine, Philadelphia, 1920; specialist certified by the American Board of Ophthalmology and the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology; fellow the American College of Surgeons; past-president of the Oregon State Medical Society; on the staffs of St. Joseph's Hospital and Grande Ronde Hospital; died in Los Angeles Feb. 18, aged 66.

Ⓜ Indicates Member of the American Medical Association.

Chandler, James Robert Ⓜ Magnolia Springs, Ala.; Birmingham Medical College, 1909; veteran of World War I; district physician for the Tennessee Coal and Iron division of the U. S. Steel Corporation for 35 years; past-president of the Bessemer (Ala.) Rotary Club; died in South Baldwin Hospital, Foley, Feb. 18, aged 76.

Christian, William I., Springfield, Ohio; Medical College of Ohio, Cincinnati, 1891; died in the Knights of Pythias Home Hospital Feb. 16, aged 93.

Clark, Fred Orlin Ⓜ Syracuse, Ind.; Indiana University School of Medicine, Indianapolis, 1931; president of the Syracuse Planning Commission; veteran of World War II; died Feb. 27, aged 53.

Conner, Robert Everett Ⓜ Hickory, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1893; on the staff of the Washington (Pa.) Hospital, where he died Feb. 22, aged 92.

Cooper, John Elbert Ⓜ Battle Creek, Mich.; American Medical Missionary College, Battle Creek, Mich., and Chicago, 1902; fellow of the American College of Surgeons; past-president of the Calhoun County Medical Society; on the staffs of the Leila Y. Post Montgomery and Community hospitals; died in the Battle Creek Sanitarium Feb. 11, aged 81.

Dodson, Austin Ingram Ⓜ Richmond, Va.; born April 16, 1891; Medical College of Virginia, Richmond, 1916; specialist certified by the American Board of Urology; served as president of the Virginia Urological Association and the Richmond Academy of Medicine; member of the American Association of Genito-Urinary Surgeons and the American Urological Association; fellow of the American College of Surgeons; professor of urology at his alma mater; on the staffs of the Medical College of Virginia, Hospital Division, St. Elizabeth's Hospital, and St. Luke's Hospital; author of "Synposis of Genitourinary Diseases" and "Urological Surgery"; died Feb. 21, aged 67.

Everingham, Sumner Ⓜ Oakland, Calif.; Columbia University College of Physicians and Surgeons, New York City, 1910; member of the founders group of the American Board of Surgery; veteran of World War II; associated with the Children's Hospital of East Bay, Peralta and Samuel Merritt hospitals; died March 4, aged 73.

Fairchild, Fred Ross Ⓜ Woodland, Calif.; Cooper Medical College, San Francisco, 1902; member of the founders group of the American Board of Surgery; member of the Western Surgical Association; fellow of the American College of Surgeons; served as health officer of Yolo County; veteran of World War I; a founder and member of the honorary staff of the Woodland Clinic Hospital; died Feb. 22, aged 83.

Gallivan, William Francis, Buffalo; University of Buffalo School of Medicine, 1909; fellow of the American College of Surgeons; formerly secretary of the Western New York Surgical Association; member of the medical advisory committee of Blue Cross and Blue Shield; associated with the Millard Fillmore Hospital, Edward J. Meyer Memorial Hospital, and the Emergency Hospital of the Sisters of Charity, where he died Feb. 20, aged 73.

Gelderman, Frederick Herman, Tucson, Ariz.; Chicago Homeopathic Medical College, 1900; died March 9, aged 82.

Gerson, Max Bernhard Ⓜ New York City; Albert-Ludwigs-Universität Medizinische Fakultät, Freiburg, Baden, Germany, 1909; author of "Cancer Therapy: Results of Fifty Cases"; died March 8, aged 77.

Greenberg, David Ⓜ New York City; University and Bellevue Hospital Medical College, New York City, 1913; past-president of the Bronx County Medical Society; veteran of World War I; for many years police surgeon; associated with the Lebanon and Jewish Memorial hospitals; consulting physician at Morrisania Hospital; died Feb. 25, aged 71.

Greene, Luther D., Richmond, Mo.; University Medical College of Kansas City, Mo., 1891; formerly member of the state legislature; for eight years on the board of regents of the Northwest Missouri State College, Maryville; died Feb. 13, aged 91.

Hombach, William Henry Sr. Ⓜ Grand Island, Neb.; John A. Creighton Medical College, Omaha, 1913; veteran of World War I; on the staffs of the Lutheran Hospital and St. Francis Hospital, where he died Feb. 20, aged 69.

Huth, Leo, Follansbee, W. Va.; (licensed in West Virginia in 1902); veteran of the Spanish-American War and World War I; died in the Veterans Administration Hospital, Aspinwall, Pa., Feb. 22, aged 80.

Imler, Daniel Canning, Willow Grove, Pa.; Jefferson Medical College of Philadelphia, 1927; on the staff of Abington (Pa.) Memorial Hospital; died Feb. 26, aged 59.

James, William Alfred Ⓜ Chicago; Northwestern University Medical School, Chicago, 1911; served on the faculty of his alma mater; on the staffs of the Garfield Park Community and Bethany hospitals; at one time a staff physician of Commonwealth Edison Company; died March 3, aged 73.

Julien, Eric Alfred Ⓜ Turlock, Calif.; Northwestern University Medical School, Chicago, 1911; first president of the staff of the Emanuel Hospital; died Feb. 24, aged 74.

Keyes, Edward Clarence, Salina, Okla.; University of Nebraska College of Medicine, Omaha, 1902; died in the Grand Valley Hospital, Pryor, Feb. 19, aged 81.

Knopf–Bravin, Rita, Pittsburgh; Woman's Medical College of Pennsylvania, Philadelphia, 1922; examining physician of Juvenile Court and school medical inspector for the city health department; on the dispensary staffs of Shadyside and Passavant hospitals; died in the Shadyside Hospital, March 9, aged 61.

Lewis, Lloyd Griffith Ⓜ Washington, D. C.; born in Remsen, N. Y., Nov. 10, 1902; Johns Hopkins University School of Medicine, Baltimore, 1928; clinical professor of urology at Georgetown University School of Medicine, where he was associate professor of urology from 1946 to 1948 and professor of urology from 1948 to 1953; instructor, associate and assistant professor of urology at his alma mater from 1933 to 1942; for many years associated with Johns Hopkins University Hospital in Baltimore; served on the staffs of the Georgetown, Doctors, and Walter Reed General hospitals; veteran of World War II; awarded Legion of Merit in February, 1946; consultant in genitourinary surgery to the Secretary of War; specialist certified by the American Board of Urology; member of the American Urological Association; fellow of the International College of Surgeons; died March 2, aged 56.

Long, Vann McKee Ⓜ Winston–Salem, N. C.; North Carolina Medical College, Davidson, 1906; county coroner; past-president of the North Carolina Urological Association; honorary staff member of the City Memorial Hospital; died Feb. 19, aged 76.

McConnell, Seth Anderson Ⓜ Major, U. S. Army, retired, Galveston, Texas; University of Texas School of Medicine, Galveston, 1916; also held a degree in law; veteran of World War I, and received the Croix de Guerre from the French government; served in the U. S. Army from 1916 to 1929, retiring with the rank of major; formerly associated with the Austin (Texas) State Hospital and the East Louisiana State Hospital in Jackson, La.; died Nov. 18, aged 72.

MacKowiak, Felix A. Ⓜ Chicago; Loyola University School of Medicine, Chicago, 1919; served as health commissioner of Riverside, Ill.; associated with Cook County Hospital and St. Mary of Nazareth Hospital, where he was past-president of the staff, and where he died March 5, aged 64.

Matikiewicz, Joseph Peter Ⓜ Thompson, Pa.; St. Louis University School of Medicine, 1937; veteran of World War II; died in the Binghamton (N. Y.) City Hospital Feb. 14, aged 52.

Murphy, John Harvey Ⓜ Moline, Ill.; Northwestern University Medical School, Chicago, 1906; veteran of World War I; honorary member of the medical staff, Hammond–Henry District Hospital in Geneseo; treasurer of the Moline Horticultural Society; died in the Moline Public Hospital Jan. 29, aged 81.

Morrissey, Paul Gunkle Sr. Ⓜ Nashville, Tenn.; University of Nashville Medical Department, 1902; member of the American Urological Association; fellow of the American College of Surgeons; associated with the Nashville General Hospital, where he was past-chairman of the board of commissioners, and Vanderbilt University Hospital; member and past-president and for many years secretary treasurer of the staff of St. Thomas Hospital, where he died Feb. 1, aged 78.

Nelson, William Thomas, Cincinnati; Howard University College of Medicine, Washington, D. C., 1904; died in St. Mary's Hospital Feb. 15, aged 82.

Newmayer, Solomon Weir Ⓜ Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1899; served on the faculty of his alma mater; formerly medical inspector of the bureau of health and medical supervisor for the board of education; consulting eye physician for Selective Service during World Wars I and II; associated with Mount Sinai Hospital, Wills Hospital, and the Hospital of the University of Pennsylvania; died in the Lankenau Hospital March 1, aged 81.

Nystrom, Elmer Edwin Ⓜ Peoria, Ill.; Northwestern University Medical School, Chicago, 1909; member of the American Academy of General Practice; formerly vice-president of the Mississippi Valley Medical Society; veteran of World War I; associated with St. Francis Hospital and the Methodist Hospital, where he died Feb. 23, aged 74.

Olds, Wilson Albert Ⓜ Colville, Wash.; Washington University School of Medicine, St. Louis, 1908; died in Mount Carmel Hospital Jan. 5, aged 75.

O'Leary, John Jeremiah Ⓜ Olympia, Wash.; University of Michigan Medical School, Ann Arbor, 1916; veteran of World War I; member of the staff of St. Peter's Hospital, where he died Feb. 16, aged 67.

Orsburn, Roy Ⓜ Sebree, Ky.; University of Louisville (Ky.) Medical Department, 1910; served as health officer of Webster, Muhlenberg, Fleming, Garrard, Lincoln, Simpson, Allen, and Marion counties; past-president of the Green River Valley Public Health Association; died Feb. 4, aged 79.

Ott, Howard, Portland, Pa.; Maryland Medical College, Baltimore, 1909; served as president of the school board and postmaster; chief burgess of Portland; member of the staff of the General Hospital of Monroe County, East Stroudsburg, where he died Feb. 14, aged 77.

Parker, Harry Lee Ⓜ Rochester, Minn.; born in Limerick, Ireland, Feb. 20, 1894; University of Dublin School of Physic, Trinity College, Dublin, Ireland, 1918; volunteered for service in the Royal

Army Medical Corps of England in April, 1918, and served in France; in June, 1919, was released from service with the grade of second lieutenant; came to Rochester, Minn., in November, 1919, as a fellow in surgery of the Mayo Foundation; in 1921 transferred his major interest to neurology; appointed to the staff of the Mayo Clinic as a consultant in neurology on Jan. 1, 1925, and instructor in neurology in the Mayo Foundation, Graduate School, University of Minnesota; subsequently was advanced to assistant professor and associate professor; became a citizen of the United States in 1927; returned to Ireland on Aug. 1, 1934, and practiced neurology and psychiatry in Dublin; appointed honorary professor of neurology in Trinity College, and was staff physician to the Richmond, Whitworth, and Hardwicke hospitals, the Stewart Institute for Feebleminded Children, the Bloomfield Mental Hospital, and the Royal Hospital for Incurables; consulting neurologist to the Meath, Mercers, and Orthopedic hospitals in Dublin; returned to Rochester in July, 1945, as a consultant in neurology in the Mayo Clinic and professor of neurology in the Mayo Foundation; specialist certified by the American Board of Psychiatry and Neurology; member of the American Neurological Association, Central Neuropsychiatric Association, British Medical Association, Royal Academy of Medicine in Ireland, the Association of British Neurologists, Central Neuropsychiatric Association, Minnesota Society of Neurology and Psychiatry, and the Alumni Association of the Mayo Foundation; fellow of the Royal College of Physicians of Ireland and of the Royal Society of Medicine of England; past-president of the Royal Academy of Medicine in Ireland and of the Dublin University Biological Association; author of "Clinical Studies in Neurology"; died in St. Mary's Hospital March 1, aged 65.

Pritchett, Asa Belvin Ⓜ San Antonio, Texas; University of Texas School of Medicine, Galveston, 1917; member of the staffs of Santa Rosa, Nix, and Baptist hospitals; died Feb. 18, aged 67.

Reece, Herbert Bowen, Sea Bright, N. J.; Albany (N. Y.) Medical College, 1905; member of the American Urological Association; died Jan. 6, aged 77.

Rhodes, Nelson M. Ⓜ Urbana, Ohio; Cleveland Homeopathic Medical College, 1906; past-president of the Champaign County Medical Society; served on the board of education for 12 years, eight of which he was president; died in the Mercy Hospital Feb. 16, aged 78.

Rogers, Jennie Maud Thomas Ⓜ Canton, Ill.; College of Physicians and Surgeons, Keokuk, Iowa, 1898; member of the American Academy of General Practice; associated with the Graham Hospital; died in the Carle Memorial Hospital, Urbana, Feb. 18, aged 82.

Rogers, Lincoln, Fallbrook, Calif.; University of Southern California College of Medicine, Los Angeles, 1896; died Jan. 21, aged 91.

Rossomondo, Frank David Ⓜ New York City; Cornell University Medical College, New York City, 1930; member of the American Trudeau Society and the Industrial Medical Association; president of the board of health, Haworth, N. J.; medical director of the McGraw-Hill publications; associate visiting physician of Bellevue Hospital and French Hospital; died in Paramus, N. J., March 7, aged 56.

Schwarz, Gottwald Ⓜ New York City; Medizinische Fakultät der Universität, Vienna, Austria, 1904; honorary member of the American Roentgen Ray Society; served as professor of radiology at the University of Vienna, and director of radiology at the Empress Elizabeth Hospital there; wrote many papers on the aspects of radiological work; died Feb. 26, aged 78.

Schwimmer, Samuel, New York City; Long Island College of Medicine, Brooklyn, 1930; veteran of World War II; served on the courtesy staff of the Beth Israel Hospital, where he died March 3, aged 53.

Scott, Benton Van Dyke Ⓜ Waverly, Ohio; Northwestern University Medical School, Chicago, 1918; veteran of World Wars I and II; retired from the regular Navy on June 30, 1939; health commissioner of Fayette, Pike, and Ross counties, with headquarters in Chillicothe; served as health officer of Hickory, N. C., and Houghton-Keweenaw-Baraga District with headquarters in Houghton, Mich.; died in the U. S. Naval Hospital, Bethesda, Md., Feb. 16, aged 64.

Scott, James Underwood, Harrisonville, Mo.; Missouri Medical College, St. Louis, 1894; associated with the Memorial Hospital, where he died Feb. 3, aged 88.

Shields, John Aloysius Ⓜ Brooklyn; Columbia University College of Physicians and Surgeons, New York City, 1898; associated with St. Mary's Hospital, where he died Dec. 16, aged 81.

Short, Jacob Ⓜ St. Paul; University of Minnesota Medical School, Minneapolis, 1928; veteran of World War II; died in Miami, Fla., Feb. 22, aged 55.

Simpson, Austin Ulysses Ⓜ Seattle; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1898; retired chief epidemiologist for the state department of health; formerly chief of laboratories for the state department of health, and at one time assistant director; served in France during World War I; formerly associated with the U. S. Public Health Service; died Feb. 6, aged 89.

Sinks, Edward Dimmitt, Lima, Ohio; Medical College of Ohio, Cincinnati, 1899; veteran of the Spanish-American War; served overseas during World War I; on the staffs of the Lima Memorial and St. Rita's hospitals; died in the Veterans Administration Hospital, Dayton, Feb. 1, aged 81.

Snyder, Roscoe Howe Ⓜ Toledo, Ohio; University of Michigan Medical School, Ann Arbor, 1927; member of the American Academy of General Practice; served during World War II; on the staff of St. Vincent's Hospital; died Feb. 21, aged 58.

Stein, David Ⓜ Philadelphia; Jefferson Medical College of Philadelphia, 1924; member of the Industrial Medical Association; on the staff of St. Mary's Hospital; died in the Jefferson Hospital Feb. 25, aged 58.

Stratton, Charles Stewart, Lowry City, Mo.; Barnes Medical College, St. Louis, 1899; died Feb. 3, aged 89.

Teaford, Benjamin Jay, Corydon, Ind.; University of Louisville (Ky.) Medical Department, 1902; veteran of World War I; at one time served as health commissioner of Bartholomew County; died Feb. 23, aged 81.

Tinker, Burgoyne Livingstone, West Middlesex, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1902; veteran of World War I; died in the Sharon (Pa.) General Hospital Feb. 24, aged 80.

Tracey, William Wallace, Norwalk, Conn.; Columbia University College of Physicians and Surgeons, New York City, 1916; died Feb. 14, aged 66.

Unruh, Rudolph Theodore Ⓜ Kinsley, Kan.; University of Kansas School of Medicine, Kansas City, 1930; served as medical missionary in the African Belgian Congo; veteran of World War II; died in the Edwards County Hospital Feb. 20, aged 59.

Van Pelt, Clifford Alexander Jr. Ⓜ Long Beach, Calif.; University of Kansas School of Medicine, Kansas City, Kan., 1937; member of the American Academy of General Practice; vice-president of the General Practice Section, Los Angeles County Medical Association; interned at St. Luke's Hospital in Kansas City, Mo.; veteran of World War II; member of the staffs of the Seaside and St. Mary's hospitals; secretary of the medical staff, Community Hospital, where he died Jan. 27, aged 49.

Vestermark, Seymour Day Ⓜ Medical Director, U. S. Public Health Service, retired, Bethesda, Md.; born in Dixon, Ill., Nov. 25, 1902; State University of Iowa College of Medicine, Iowa City, 1931; specialist certified by the American Board of Psychiatry and Neurology; fellow of the American Psychiatric Association, which last January cited him for his outstanding service to psychiatry; from 1948 to 1958 chief of the training and standards branch of the National Institute of Mental Health; past-president of the Commissioned Officers' Association of the U. S. Public Health Service; died in the U. S. Public Health Service Hospital, Baltimore, Feb. 22, aged 56.

Vinnedge, Kenneth Houston Ⓜ Captain, U. S. Navy, retired, Quincy, Ill.; born in Waterloo, Iowa, April 21, 1901; University of Illinois College of Medicine, Chicago, 1930; specialist certified by the American Board of Radiology; member of the Radiological Society of North America and the American College of Radiology; entered the U. S. Navy in June, 1929; at different times was chief of the department of radiology at Naval hospitals at Great Lakes, Ill., Philadelphia, Brooklyn, Pearl Harbor, Hawaii, Coca Sola, Canal Zone, and Oakland, Calif.; during World War II was first assigned as senior medical officer on the cruiser Columbia at Guadalcanal, later as staff medical officer of the commander of naval forces in the Southwest Pacific, and finally as executive officer of the naval hospital at Guam; when he retired in May, 1953, was executive officer at the Naval Hospital at Great Lakes; died in Daytona Beach, Fla., March 5, aged 57.

Wood, Kavanaugh Payne, Lena, Miss.; Memphis (Tenn.) Hospital Medical College, 1909; on the staff of the Leake County Memorial Hospital in Carthage Jan. 27, aged 78.

Wood, Lawrence Edward Ⓜ Kansas City, Mo.; University of Kansas School of Medicine, Kansas City, Kan., 1926; member of the American College of Chest Physicians and the American Trudeau Society; associate clinical professor of medicine at his alma mater; served as president of the Missouri State Tuberculosis Association and as a member of the board of the National Tuberculosis Association; veteran of World War II; on the staff of the University of Kansas Medical Center in Kansas City, Kan., and St. Luke's Hospital; affiliated with the Veterans Administration Hospital; died Feb. 3, aged 59.

Woods, Limmie Bradford Ⓜ Lubbock, Texas; Southwestern University Medical College, Dallas, 1911; during World War II a lieutenant colonel in the Texas State Guard; formerly city health officer; on the staff of the Methodist Hospital; died Feb. 5, aged 71.

Zimmerman, Victor Leo Ⓜ Chatham Center, N. Y.; Bellevue Hospital Medical College, New York City, 1897; fellow of the American College of Surgeons and the New York Obstetrical Society; past-president of the Brooklyn Gynecological Society; veteran of the Spanish-American War; associated with Brooklyn, St. Mary's and Holy Family hospitals in Brooklyn, and Mary Immaculate Hospital in Jamaica; died in the Columbia Hospital, Hudson, Feb. 3, aged 87.

FOREIGN LETTERS

AUSTRIA

Carcinoma of Skin.—At the meeting of the Society of Physicians in Vienna on Feb. 27, Dr. A. Matras stated that in cork tile factories a mixture of cork chips is cast into tiles by adding heated coal tar pitch. The workmen are constantly exposed to special risks due to the effects of the pitch dust which are particularly severe when further exposed to solar irradiation. In the course of years the exposed skin of the workmen develops a bronze pigmentation and a verrucous hyperkeratosis, which forms the basis for the formation of carcinoma which often occurs only after several decades of exposure and develops particularly in the face, hands, and forearms. In a series of six patients carcinoma of the nose was observed in one after eight years of occupational exposure. In the others carcinoma was observed only after an average exposure of 29 years. In five of the six patients the carcinoma was cured by combined surgical removal and irradiation, but one patient died of a pharyngeal extension of the carcinoma.

Progress in Cerebral Angiography.—At the meeting of the Society of Physicians in Vienna on Feb. 20, Dr. H. Brenner described the attempts to make cerebral angiography a more valuable, simpler, and less dangerous procedure. Simple puncture with a cannula armed with a syringe; injection, without a tube, of 3 to 5 cc. of a mixture of methylglucamine salt and sodium salt of 3, 5-diacethylamino-2,4,6-triiodobenzoic acid (Urografin); and simultaneous serial exposures at selectable intervals with the aid of the Siemen's cranial film transport mechanism proved to be highly advantageous in almost 500 angiographies. General anesthesia is limited to a few indications, and local anesthesia is to be avoided. Further advantages of the method include short exposure time, large focal film distance, and large size of picture. Filming was successful in 99.8% of cases. Complications did not occur despite unfavorable factors presented by some patients.

Thrombosis.—At the meeting of the Austrian Society for Gynecology and Obstetrics in Vienna in February, Dr. H. Leeb reported that thrombosis is prevented in his patients by early ambulation, physical exercise, and massage. Chemoprophylaxis is possible only in patients who are in danger. Venostasin (an extract of horse chestnuts containing vitamin B_1) given intravenously for seven days postoperatively proved to be effective insofar as it reduced the thromboses, in a series of 1,393 patients, to almost half of the expected number. The number of infarctions was not influenced. An increase in the number of cases of thrombosis in the week after termination of treatment suggests that prophylactic doses of Venostasin should be continued until the patient is completely recovered. Panthesine (*p*-aminobenzoyl-N-diethylleucinolmethansulfonate), Hydergine (methanesulfonates of hydrogenated ergotoxic alkaloids), and phenylbutazone were used prophylactically. Early ambulation and physiotherapy were considered the most important prophylactic treatment in the control of venostasis. The physician should be on the lookout for early signs of thrombosis. Should a deep thrombosis occur heparin or phenprocoumon should be given.

Varicose Veins.—At the same meeting Dr. K. Sigg stated that it is possible to cure all varicosities in ambulant patients with injections of sclerosing agents. Varicose ulcers also benefit from this treatment. Sclerosing agents should not be used, however, without compression bandages. They should not be injected into patients while they are standing; the leg should be horizontal. Only small amounts of these agents should be used for each injection. Several such injections, possibly in both legs, can be made in one session. The patient should not be confined to bed when she has a reaction to the sclerosing injection, but should continue treatment with firm compression and continue with her work. Fast palliation if severe pain occurs may be achieved by an injection of phenylbutazone. More than half of all varicose ulcers are the result of a deep thrombosis. All such ulcers can be healed by compression with an elastic bandage, which makes the edema disappear. The patient does not have to be confined to bed.

Good prophylactic treatment of thrombosis may prevent the severe, deep, often fatal thrombosis which may be followed by ulcers and varicosities. Treatment of the superficial thrombosis should never consist of bed rest. Incision of the superficial thrombosis results in sudden subjective and objective improvement. On initial treatment a firm compression bandage is applied. This is covered by an elastic bandage. Within several hours after phenylbutazone was given pain was relieved and the swelling and acute redness disappeared. This enabled the patients who were immobilized by pain

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The items in these letters are contributed by regular correspondents in the various foreign countries.

to walk again and continue with their work. The deep thromboses should likewise not be treated by bed rest either, except in patients with fracture of the spine or femur or severe systemic disease. Therapy by compression and early ambulation after operations and deliveries combined with the administration of phenylbutazone is important in the prophylactic treatment and constitutes better management than treatment with anticoagulants. Treatment of thrombosis without a compression bandage is inadequate.

Hormonal Cytodiagnosis in Man.—At the same meeting Dr. K. Klein reported having tested the reaction of the male oral mucosa to hormonal stimulation. Cytological and cytometric examinations of 600 oral smears showed that the male oral mucosa, when stimulated by estrogens or androgens, is as a rule subjected to the same laws as the female oral and vaginal epithelium. The sensitivity to hormonal influences, though, is lower than in women. The method is adequate as a morphologic aid in the objectification of disturbances of the sexual hormonal balance in man and their response to therapy.

BRAZIL

Congenital Heart Defects.—Dr. Sylvio Borges and co-workers presented to the Fifth Regional Meeting of the Associação Paulista de Medicina a report on the treatment of 1,000 successive patients with congenital heart defects. They classified their patients as those (1) with a proved diagnosis (326); (2) with clinical findings complemented by electrocardiograms, phonocardiograms, and roentgenograms sufficiently characteristic to establish the diagnosis (321); (3) with a doubtful diagnosis (199); (4) with congenital cyanosis (57); (5) without cyanosis (38); and (6) those difficult to classify (59). A definite diagnosis was made in 647 (the first two groups). The most frequent malformation found was the tetralogy of Fallot, present in 11.2% of patients. The second was the interventricular septal defect (10.7%), followed by the interauricular septal defect (7.9%), patent ductus arteriosus (7.4%), and coarctation of the aorta (2.8%).

Electrocardiography During Artificial Hibernation.—The use of artificial hibernation for cardiovascular operations is increasing every day, but hibernation with circulatory arrest is not without danger. R. Marques Lisboa and co-workers of the Rio de Janeiro Sanatorio Santa Theresa (*Revista brasileira de cirurgia*, vol. 36, 1958) made periodic electrocardiograms of 17 dogs operated on under artificial hibernation with a circulatory arrest of 8 to 10 minutes. They observed that arrhythmia was not present during the induction phase of hibernation. The reduction of the dogs' temperature from 40 to 29 C (104 to 84 F) was responsible for the lessening of the heart rate by an average of 80 beats per minute. During this phase the electrocardiograms frequently showed increase in the duration of the P wave, the P-R interval, the QRS complex, and the QT segment, and modifications in the morphology of the ST-T complex and appearance of the so-called Osborn's waves. The duration of the QT interval showed a striking increase, quite out of proportion to the frequency of the heartbeat. This and the frequent alterations of the morphology of the ST-T complex and the appearance of Osborn's waves suggested the presence of electrolytic disturbances as the main cause of these alterations.

Contrary to the reports of other authors, in no one dog of this series was ventricular fibrillation caused by hypothermia alone. This may have been caused by the fact that the dogs' temperatures never were brought below 26 C (79 F), but the authors observed a marked irritability of the myocardium during handling of the heart by the surgeon, with frequent appearance of ventricular fibrillation; in contradistinction to most reports, however, this fibrillation was reversible by electric shock and massage. This did not occur in only one dog. The occlusion of the circulation during hypothermia was responsible for the appearance of ventricular arrhythmia, in all cases represented by ventricular fibrillation or idioventricular rhythm. Afterwards the QRS complexes became more and more similar to those registered at the beginning of hypothermia, attaining at last a nodal rhythm. In almost every dog the T waves remained negative until awakening. The authors believed that circulatory arrest and ventricular fibrillation cause, in artificially hibernating dogs, an extreme depression of the heart and its conduction system, responsible for the appearance of the idioventricular rhythm. They based their opinion on the marked progressive decrease of the heart rate and the transformation of the QRS complex to more and more abnormal shapes of longer duration in the course of the circulatory arrest.

ICELAND

Poliomyelitis.—Julius Sigurjónsson (*Nord. med.* 61:174-177 [Jan. 29] 1959) stated that poliomyelitis has apparently been endemic in Iceland since 1924 and that extensive epidemics have occurred periodically only once in about 10 years. A marked shift in age selection in the direction of adolescents and adults has been observed in the more recent epidemic years. The shift was considered to be exaggerated, however, as a result of confusion with a simultaneously prevalent poliomyelitis-like disease sometimes called Iceland disease. Of 459 poliomyelitis cases with 89 deaths reported for 1924 148 were in patients under 4, 185 in those between 5 and 14, and the rest in patients between

15 and 60 years of age. Of 300 cases with 29 deaths reported for 1935 75 were in patients under 4 and 110 were in patients between 5 and 14 years of age. The trend started to change in 1945 with 368 cases and 10 deaths, with 52 in patients under 4 years of age, 110 in the 5-to-14-year-old group, and 113 cases for the 20-to-39-year-old group. In 1946-1947 there were 671 cases with 18 deaths and in 1955-1956 1,154 cases with 3 deaths.

INDIA

Aortic Regurgitation.—V. G. Joshi (*Journal of the Association of Physicians of India*, vol. 7, January, 1959) reviewed a series of 39 patients (32 men and 7 women) who had aortic regurgitation. Of these 25 came to hospital as medical emergencies, with signs and symptoms suggestive of cardiac failure. Only three were asymptomatic. The age at onset of symptoms varied from 15 to 70 years. Although the disease in the earlier age group was predominantly rheumatic in origin and in the later age group syphilitic in origin, this was not always true. Thus one patient with syphilitic aortic lesions came to hospital with signs of heart failure before the age of 25 years while another with a definite history of rheumatic fever and combined mitral and aortic lesions was admitted for heart failure at the age of 40. The interval between primary infection and onset of symptoms in the syphilitic group varied from about 5 to 20 years. The corroborations of syphilis by history and by positive serologic tests were not always correlated. Tertiary cardiovascular syphilis in the form of aortic regurgitation occurred within two years of primary infection in two patients before the age of 25.

Eleven patients complained of precordial or epigastric pains. In one this was due to an enlarged tender liver, in another to hypercyanotic angina, and in the rest to coronary insufficiency. Angina was thus noticed to be an early and important symptom of aortic regurgitation. Only two patients complained of an anginal syndrome before the onset of dyspnea. Three had palpitations and one of these had an irregular rhythm with extrasystoles. Three gave a history of fever and in one this was probably due to subacute bacterial endocarditis. Thirty showed enlargement of the heart.

The first mitral sound was accentuated in eight and weak or partially replaced in three patients. In seven the second aortic sound was normal and in another seven feeble or absent. It was split in one patient. The second pulmonary sound was accentuated in eight and weak in five. An accentuated first mitral sound always indicated concomitant mitral stenosis or left ventricular hypertrophy. A weak or absent second aortic sound was not a constant finding and not diagnostic of aortic regurgitation; but in no case, even with systolic hypertension, was the aortic second sound accentuated. An accentuated pulmonary second sound meant associated mitral disease. A diastolic thrill was palpable at the apex in five patients and a systolic in three. A diastolic thrill at the base was present in two and a systolic in two. A diastolic murmur at the base was heard in 38 and could be described variously as soft, blowing, harsh, musical, early, and to-and-fro. The murmur was heard best on the left side of the sternum in the third and fourth interspace in 22 patients and also equally on the right side of the sternum either alone or in combination with the above in 23.

An associated diastolic thrill was noticed in two. In one it was associated with a diastolic thrill at the apex and in another with a systolic thrill at the base. A systolic thrill over the base was felt in three and indicated associated aortic stenosis. In five patients with a diastolic thrill at the apex there was an associated mitral stenosis, while in two a systolic thrill at the mitral area indicated mitral regurgitation. A combination of systolic and diastolic elements of a to-and-fro murmur heard diffusely over the precordium, the diastolic element of which was heard best to the left of the sternum, was the most frequent auscultatory finding in this series. In four patients with congestive heart failure a diastolic murmur at the base was either missed or absent at the first examination but became apparent when the failure partially resolved after treatment.

Twenty-nine patients had a Corrigan pulse and 33 showed increased pulse pressure. The systolic blood pressure was more than 160 mm. Hg in 12 patients and the diastolic more than 100 mm. Hg in 2. Increased pulse pressure was a more reliable sign than a Corrigan pulse. Four patients had severe and 15 had moderate anemia. The serologic tests for syphilis were strongly positive in 26 patients and doubtful in 2. Radiologically, enlargement of the heart was present in 21 patients, the left ventricle being mainly affected. Seventeen showed diffuse dilatation of the aorta and nine had an enlarged left auricle. The electrocardiogram showed evidence of left ventricular hypertrophy or strain in 21 patients, combined left and right ventricular hypertrophy or strain in 3, and myocardial damage in 16. Thus more patients showed myocardial damage and coronary insufficiency on electrocardiographic examination than clinically.

Causes of Tooth Loss.—F. S. Mehta and co-workers (*Journal of the All-India Dental Association*, vol. 30, December, 1958) analyzed the nature of 11,830 teeth requiring extraction in 4,278 patients. The primary causes of extraction included (1) caries, (2) periodontal disease, (3) impactions, (4) facilitation of better prosthetic restoration, (5) correction or prevention of malocclusion, (6) supernumerary teeth, (7) trauma, and (8) alveolar abscess. Periodontal disease accounted for 66.3% of the teeth lost and caries for 26.7%. Impactions accounted for only 0.5% and supernumerary teeth for about 0.1%. Extractions due to caries were significantly higher among women than men. The largest number of extractions was in persons 41 to 50 years of age. Extractions due to caries were more frequent in the younger age group (11 to 30) as compared to periodontal disease, while the reverse was true in the older age group. The average number of extractions was maximal in periodontal disease, being 6.24 per patient, while caries accounted for 2.32 teeth per patient. In almost all diseases, the average number of extractions per person was more in women than in men. The number of extractions per patient for prosthetic reasons was high. The average number of extractions per patient increased with increasing age.

UNITED KINGDOM

Artificial Kidney for Streptomycin Poisoning.—It is well known that streptomycin can cause vestibular damage and deafness and that this is more likely to occur in patients with defective renal function. The fact that the drug is normally eliminated from the body by glomerular filtration suggests the possibility that it may be removed in an emergency by extracorporeal hemodialysis. Tests carried out by Edwards and Whyte showed that this is possible, and they now regard the administration of streptomycin in an oliguric patient as a clear indication for early treatment with the artificial kidney (*Brit. M. J.* 1:752, 1959). A simple semiquantitative test showed that streptomycin could be dialyzed from blood across the same cellulose membrane as is used in the artificial kidney. From 40 to 100% of an added quantity of streptomycin diffused across the membrane in 18 hours. Five oliguric patients receiving a dose of more than 1 Gm. of streptomycin were treated by hemodialysis for varying periods. No sign of streptomycin toxicity developed. The authors emphasized the importance of estimating renal function before giving a course of streptomycin.

Hazards of Subway Travel.—At a meeting of the Royal Society of Health Dr. L. G. Norman, the London Transport Executive's chief medical officer, discussed the possibility of banning smoking on London's subway. He thought that public opinion would gradually turn against smoking in public places until no smoking would be permitted in the subway. The London Transport Executive has set up an operational research team to investigate the desirability of increasing the nonsmoking accommodations from 30 to 50% of the total. Dr. Norman said that a taciturn Englishman does not spread infection as readily as his more voluble neighbor. Not talking in trains helps to keep down infection, particularly when large numbers of people stand with mouths and noses in close proximity. The closed mouth minimizes the spread of infection. Dr. Norman also suggested that a few minutes' travel in a train or public vehicle close to an infective neighbor who literally keeps his mouth shut may produce some degree of immunity, as only a small inoculating dose of organisms passes from the infected person to the other.

Inquiry into Drug Prices.—Inquiries into the prices of standard drugs and proprietary preparations were prompted by complaints by the Committee of Public Accounts that pharmacists were enjoying unintended profits on National Health Service drug prescriptions. This was disclosed by the treasury in a comment on the committee's reports. The committee recommended some immediate general reduction in the drug tariff. The treasury now reports that, since March, 1958, the Ministry of Health has made reductions in the reimbursement rates which are estimated to produce savings totaling about $1,064,000 per year. It agrees that so long as the prices actually paid by pharmacists for drugs are not known there can be no assurance that their remuneration is no more than is fair or reasonable. Proposals for further inquiries into the actual cost of drugs are being discussed with the druggists.

Rubella and Pregnancy.—Dr. Julia Bell collected data on the outcome of 712 pregnancies in women who had rubella during pregnancy (*Brit. M. J.* 1:686, 1959). In 694 cases the infection occurred within the first 16 weeks, and in the rest the time of onset was unknown. Information was obtained from hospitals in which the children were born, from questionnaires sent to parents of children just starting school, and from special hospitals for the deaf, the blind, and cardiac cripples. The 712 pregnancies resulted in 421 defects, some children having more than one defect. Cataract was noted in 491 cases (69%), deafness in 263 (37%), and congenital heart disease in 210 (30%). In addition, 70 children were found to show defects other than the three characteristic ones. Many of these defects were not present at 2 years of age but were noted at 6 years or later. The peak incidence of all congenital defects was in children whose mothers had rubella between the fifth and eighth week of pregnancy. This accounted for 35% of the total. The next peak occurred between the 9th and 12th week of pregnancy, during which 100 children, or 24%, were affected. The author believed that abortion should be performed in all cases in which rubella occurs within the first 12 weeks of pregnancy. After that the chances of defects in the offspring are about one in eight.

CORRESPONDENCE

WHIPLASH INJURIES

To the Editor:—I have read the paper on whiplash injuries by Dr. Emil Seletz in The Journal, Nov. 29, 1959, and must take issue with many statements therein. The statement is made that "The disturbance of the great occipital nerve is further aggravated by spasm of the trapezius muscle, since traction is thereby exerted on the nerve as it pierces the tendinous attachment of the muscles to the base of the skull." I seriously doubt that spasm of the trapezius muscle is capable of producing traction on the second cervical nerve and would welcome an explanation as to the mechanism of traction on this nerve by spasm of the trapezius.

Dr. Seletz further said, "Please remove the term (whiplash injury) from your wastebasket to a place of prominence on your mahogany desk." Dr. Seletz' orthopedic friend, to whom this statement was directed, probably does not take objection to the term "whiplash" per se but rather feels that it is no more descriptive than the statement that a patient "turned his ankle" in describing a sprain of the ankle joint. Whiplash injury denotes no specific pathological or anatomic derangement, and the term, therefore, has fallen into disrepute. The patient has sustained a strain of the cervical spine, or a fracture, or a dislocation. The mechanism of injury may have been on a whiplash basis, but the pathological fiindings are not a whiplash injury.

Dr. Seletz further stated that, "In addition, the disk portions are even smaller in their relative sizes, because on either side the space is occupied by special synovial joints not present in other parts of the spine. Although described in 1858 by Von Luschka, they are rarely given proper attention because of the misleading diminutive proportion, but the role played by them is most significant." Furthermore, though Dr. Seletz stated that the role of these joints is more significant, he did not elaborate on this. To my knowledge these joints are of relatively little significance, and there is further question that they are actually joints.

Again I quote, "With degenerative thinning of the disk after trauma, the processes of the lateral joints are gradually forced outward and laterally, resulting in osteophyte formation." I doubt that the processes of the lateral joints are forced in any direction. Certainly osteophyte formation may occur as a result of proliferation at ligamentus attachments. I also doubt that the lateral joints are actually "forced out."

Another quotation is "If the blood vessel wall has been traumatized during the injury or the vertebral nerve has been injured, vasospasm persists. The only true, effective measures for tiding over this stage of injury lie in adequate physical therapy." This statement is much too sweeping in its scope, and certainly vascular surgeons and those familiar with the treatment of vasospasm believe that there are multiple adjunctive measures other than "adequate physical therapy" to relieve vasospasm.

Dr. Seletz' statements relative to traction without clarification of the uses and abuses of traction are much too sweeping and are in direct opposition to his earlier statements relative to traction on the second cervical nerve produced by "spasm of the trapezius."

I further would question the following statement: "I personally resent the extensive use of the so-called tranquilizing drugs in this type of case, the sole purpose of which is to confuse the mind so that the patient will not complain." I doubt that any physician has ever prescribed a tranquilizing drug for the purpose of confusing the patient's mind so that the patient no longer complains.

Lee James Cordrey, M.D.
1102 W. Cass St.,
Tampa, Fla.

WHAT IS AN INTERNIST?

To the Editor:—There seems to be increasing interest in defining, in a concise manner, the functions of an internist. Probably because internal medicine is such a broad field, it is easier for the public to think of an internist in terms of what other specialists are not. This leads to the confusing of internists with general practitioners and interns.

In an effort to find a positive, concise definition of an internist, we are publishing in the Program of the 49th Annual Session of the American College of Physicians held in Chicago, April 20-24, 1959, the following suggested definition: "An internist is a physician trained as a specialist in the diagnosis and medical treatment of internal diseases in the adult." We shall welcome criticisms, comments, and improvements on this definition.

Eliot E. Foltz, M.D.
530 Winnetka Ave.
Winnetka, Ill.

MEDICAL LITERATURE ABSTRACTS

THERAPEUTICS

Acute Granulocytic Leukemia in Pregnancy: Report of Four Cases with Apparent Acceleration by Prednisone in One. H. Rothberg, M. E. Conrad and R. G. Cowley. Am. J. M. Sc. 237:194-204 (Feb.) 1959 [Philadelphia].

Acute granulocytic leukemia was observed in 4 pregnant women, between the ages of 15 and 35 years. Although in a recent comprehensive review of the subject it was maintained that corticosteroids should be preferred to any of the antimetabolites for the treatment of acute leukemia during pregnancy, these 4 cases show that corticosteroids also may have their drawbacks in the therapy of this disease in the pregnant patient. The first of the 4 pregnant women did not receive specific treatment for her acute leukemia; she was delivered spontaneously of a macerated fetus, whose death was attributed to premature separation of the placenta; the mother died 2 days after the delivery. The second woman conceived while being treated with mercaptopurine for her granulocytic leukemia; despite this fact and the prolonged use of mercaptopurine and cortisone, and, in addition, of aminopterin sodium and a trial of desacetylmethylcolchicine (Demecolcin), she was delivered spontaneously of a premature infant, which was free of any malformation, and died 5 days after the delivery. Although the simultaneous use of several drugs made it impossible to attribute either of the 2 remissions in this case to any one agent with certainty, it was clear that cortisone was at least not harmful to the patient and was probably beneficial.

In the third patient the administration of prednisone was associated with a dramatic acceleration of the leukemic process, manifested by a rapid rise in the leukocyte count and severe bone pain. Although the mechanism remains obscure, the case of this patient added to the increasing accumulation of clinical evidence that steroid hormones may aggravate certain cases of acute granulocytic leukemia. Because of this unfavorable experience with steroid therapy, the fourth patient was treated with mercaptopurine only; this drug was given during the last 4 months of pregnancy. The patient bore her pregnancy well and had a full-term normal delivery. There was no evidence of any deleterious effect of the mercaptopurine on the fetus. The only evidence of drug toxicity in the mother was a marked leukopenia during the initial phase of therapy, associated with an acute febrile attack; this was controlled by withdrawal of the mercaptopurine and institution of antibiotic therapy.

The limited life expectancy of the patient with acute leukemia makes it highly unlikely that she can sustain a normal pregnancy. Fetal salvage is low irrespective of treatment. There is no evidence of transplacental transmission of leukemia. In the management of acute leukemia in pregnant women, steroids are not necessarily superior to antimetabolites. The best over-all therapeutic regimen is that which is most effective against the leukemia itself.

Reserpine, Gastric Secretion, and Peptic Ulcer. W. H. Bachrach. Am. J. Digest. Dis. 4:117-124 (Feb.) 1959 [New York].

The author made clinical and laboratory observations on private patients and on patients in the neuropsychiatric hospital of the Veterans Administration Center in Los Angeles, who had been treated with reserpine for hypertension or for psychotherapeutic sedation, as well as on patients treated for peptic ulcers in the gastroenterology section of the Wadsworth Hospital of the V. A. Center. Neither these data nor a review of the literature yielded any convincing evidence that reserpine is an important ulcerogenic agent. Single, orally administered doses of reserpine (0.25 to 0.5 mg.), such as are used in the management of hypertension, stimulate the secretion of hydrochloric acid by the stomach only mildly; this effect may be prevented by the simultaneous administration of a therapeutic dose of an anticholinergic drug. Prolonged therapy with reserpine in these doses does not lead to gastric hypersecretion. Single large doses of reserpine (1 mg. or more), given orally or parenterally, usually provoke an intense and sustained secretion of hydrochloric acid, which is not prevented by even large doses of anticholinergics. The cumulative effects of these large doses are unknown. Large doses of reserpine are

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The place of publication of the periodicals appears in brackets preceding each abstract.

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used in psychotic patients, who should, therefore, be screened for the presence of ulcer before and at intervals during treatment. Reserpine in large doses should be used with caution, or not at all, in patients with ulcer, but the reported data do not indicate that this constitutes an important problem in the over-all applicability of the drug.

Induction of Acute Gastric Lesions by Histamine Liberators in Rats: Effects Thereon of Pharmacologic Blocking Agents. S. Franco-Browder, G. M. Masson and A. C. Corcoran. J. Allergy 30:1-10 (Jan.-Feb.) 1959 [St. Louis].

The authors report on experiments performed on rats to demonstrate the nature of gastric lesions evoked by a potent histamine liberator, polymyxin B, and to attempt an analysis of their mechanism by administration of drugs which are known to block some of the pharmacological effects of naturally occurring amines. Three groups of 12 animals each received treatment, consisting of a single intraperitoneal injection of polymyxin B in doses of 2.0, 1.0, and 0.5 mg. per kilogram of body weight respectively. Within minutes after the injection the animals were in shock, prostrate, cyanotic, and dyspneic. Seven hours later 6 animals from each group were killed, and autopsy was performed. Large, dark, purplish areas, located exclusively in the glandular part of the stomach, were visible through the serous surface. Besides these lesions, hemorrhagic ulcerations were seen in part of the cecum.The glandular mucosa of the stomach showed hemorrhagic erosions which polymyxin B had caused in all the animals, but the effects of the substance were less in those given the smaller doses, the incidence and severity of the lesions decreasing sharply in those given only 0.5 mg. The remaining 6 animals of each group were killed from 1 to 4 days after the injection of polymxyin B. Autopsy revealed that healing of the stomach walls had begun immediately and that epithelization may be complete in 4 days.

The effects of pharmacological blocking agents on the production of gastric lesions were next studied in 80 polymyxin-treated rats. Results in terms of gastric ulceration showed that only the antihistamines and phenoxybenzamine hydrochloride (Dibenzyline), an adrenolytic compound which also possesses antihistaminic properties, afforded protection from the ulcer-inducing properties of polymxyin B. In order of effectiveness the antihistamines were promethazine (Phenergan), chlorpheniramine (Chlor-Trimeton), phenindamine (Thephorin), and parabromdylamine (Dimetane). Phenoxybenzamine was as active as promethazine in protecting against erosions, but two other blocking agents, lysergic acid diethylamide (LSD) and chlorpromazine, had no significant effect on the incidence and severity of gastric ulcerations.

The authors studied the modification of the toxic effects of polymyxin B in 8 rats pretreated with reserpine or dextran. Reserpine in dosage of 3 mg. per kilogram of body weight had been given 48 hours before the injection of polymyxin B to 12 animals in one group and dextran in dosage of 300 mg. per kilogram had been given 24 hours before polymyxin injection to 6 animals in another group. Of the controls, 12 animals received polymyxin B alone, 12 received reserpine alone, and 6 received dextran alone. Polymyxin B elicited shock and death in one-half of the animals in the first group; reserpine provoked drowsiness, piloerection, salivary hypersecretion, and defecation in the animals in the second group; dextran caused only hyperemia and edema of the nose and extremities in the animals in the third group. When polymyxin B was given to rats pretreated with reserpine, shock did not occur, and the extremities were hyperemic rather than cyanotic. Symptoms usually caused by polymyxin B were alleviated in those rats pretreated with dextran; shock did not occur, and only some of the animals experienced moderate dyspnea and cyanosis. Examination of the stomach showed that dextran was the only agent that had not caused gastric lesions, reserpine had provoked the formation of punctiform erosions, but these were insignificant as compared with those evoked by polymyxin B. Reserpine had no effect on the gastric lesions induced in rats that 2 days later received polymyxin B, whereas a prior administration of dextran reduced the severity but not the incidence of the erosions.

These experiments show that the toxic effects of polymyxin B may be modified by other amine liberators and its ulcer-inducing properties may be suppressed by adequate dosages of antihistaminic and adrenolytic agents. The method described provides a new technique for the production of gastric ulcers and for study of their healing.

PATHOLOGY

Benign Thymoma and Selective Erythroid Aplasia of the Bone Marrow. E. M. Jacobs, R. V. P. Hutter, J. L. Pool and A. B. Ley. Cancer 12:47-57 (Jan.-Feb.) 1959 [Philadelphia].

The association of anerythroid anemia and benign thymoma has recently emerged as a clinical and pathological entity. The recognition of this association is of particular interest because of the occasional complete remissions of the anemia after thymectomy. During 1957, 2 patients at Memorial Center for Cancer and Allied Diseases, New York, were found to have this syndrome. Their histories are presented. The first patient, a 58-year-old man, had a thymoma that was benign, or at worst locally malignant, for 18 years before severe anemia developed, which was associated with selective aplasia of the erythroid precursors in the bone marrow. This man also had mild thrombocythemia of an obscure nature. His death was caused by viral hepatitis presumably resulting from blood transfusions. The second patient, a 64-year-old woman, presented with both a large benign thymoma and anerythroid anemia. In this patient removal of the thymic tumor was followed by complete hematological remission.

Five cases of thymoma with coexisting anemia were reported from 1928 to 1953. Since 1953 an additional 21 cases, including the 2 cases recorded here, have been reported. The clinical features of these 26 patients are analyzed. In 17 of the patients there was a virtual absence of reticulocytes in the peripheral blood and a selective aplasia of the erythroid precursors in the marrow without any other hematological abnormality. The remaining 9 patients had other hematological abnormalities, but the essential change in the bone marrow of 5 of these patients was absence of the erythroid series. Five of the 26 patients had myasthenia gravis in addition to the thymoma.

Since a causal relationship between benign thymic tumors and erythroid aplasia was suggested in previous reports, all cases of thymic tumor in adults seen at Memorial Center for Cancer and Allied Diseases since 1926 were reviewed. There was a total of 30 thymomas with pathological confirmation; 14 were true thymomas, and the others were malignant thymomas of the seminomatous type. Of the 14 patients with benign thymoma, the 2 described here were the only ones who had any degree of anemia. The incidence of myasthenia gravis among these 14 patients was the same. None of 16 patients with malignant thymoma had either this kind of anemia or myasthenia gravis.

Of 46 cases of selective erythroid aplasia reported in the literature, 26 (or 52%) of the patients had an associated benign thymoma. Of 16 patients with this syndrome who underwent thymectomy, 4 patients (including the second one mentioned above) obtained a complete hematological remission, and an additional 3 patients showed definite but incomplete improvement in the anemia. No histological criteria could be defined which were unique to thymomas associated with anerythroid anemia. The authors conclude that benign thymomas are associated with anerythroid anemia with approximately the same frequency as with myasthenia gravis. Therefore, any patient with benign thymoma should be kept under continuous hematological control. Since about half of the adult patients with anerythroid anemia have an associated benign thymoma, search for such a tumor is strongly indicated in any patient who presents this type of anemia. Although thymectomy only occasionally and unpredictably induces hematological remissions, it is the only effective procedure available. The pathogenetic mechanisms relating benign thymoma to anerythroid anemia remain obscure.

Hemangiopericytoma of Stout and Murray. F. Coste, J. Uro and J. Guilaine. Presse méd. 66:2029-2030 (Dec. 25) 1958 (In French) [Paris].

Hemangiopericytoma presents prognostic difficulty, because histological findings may suggest a benign lesion, whereas the medical observation reveals malignancy. It seems that the location of the primary lesion is decisive for the prognosis. The authors report a patient, 51 years of age, in whom a painless and apparently benign tumor, the size of a walnut, appeared on the upper margin of the right popliteal fossa in 1930 and had been quiescent for 20 years. The tumor began to expand in 1950, so that the circumference of the right thigh had been gradually increasing, but without accompaniment of pain. After 6 years of gradual growth on the part of the thigh tumor, pain appeared in the right side of the sacroiliac region, followed after a few months by the appearance of a tumor in the posterior iliac region. The new tumor had the same characteristics, but its growth progressed faster than that of the primary lesion. Roentgenologic examination in July, 1957, revealed osteolysis on the right side of the ilium. The pain grew worse, evolving into sciatic neuralgia a month later.

The tumor in the right thigh was voluminous and appeared to be a sarcoma at the time of the patient's admission. There was a marked venation under the skin of the tumor, and a slightly elevated local temperature. The tumor was not hard in consistency; several nodes were palpated under its skin, mostly in the region of the popliteal fossa. A murmur synchronous with the pulse was auscultated in the thigh. No abnormality of the adjacent lymph nodes was noted. A longitudinal band of indurated tissue, 5 to 6 cm. in length, was palpated in the anterior side of the thigh.

The tumor in the iliac region had features similar to those of the tumor in the thigh, including venation under the skin and a distinct pulsation. Roentgenologic examination revealed the band of indurated tissue under the skin of the thigh tumor and a considerable osteolysis on the right side of the ilium and of the sacroiliac joint, but the bones of the right leg were normal. Specimens of the thigh induration and of the tumor in the popliteal fossa were obtained by biopsy. The microscopic examination revealed that the induration in the anterior side of the thigh was an osteoma unrelated to the tumor in the popliteal fossa. The latter tumor was a whitish mass, well encapsuled, with surface venation, which was diagnosed as a nonmalignant hemangiopericytoma. This case demonstrates the incidence of a clinically malignant hemangiopericytoma, which malignancy could not be confirmed by histological findings.

The Use of Selective Media for the Detection of Beta-Haemolytic Streptococci. W. Brumfitt and P. L. Masters. J. Roy. Army M. Corps 105:38-41 (Jan.) 1959 [London].

The isolation of beta-hemolytic streptococci from the throats of healthy carriers and convalescent patients is difficult. Several techniques have been devised to improve the yield of streptococci. Because the authors were examining large numbers of throat swabs, they decided to compare some of these methods. Swabs from 2,000 soldiers not having sore throats were cultured on blood agar, aerobically (method 1), anaerobically (method 2), and aerobically with the addition of crystal violet to the medium (method 3). Swabs from 520 healthy children and adults were plated on blood agar aerobically (method 1), on crystal violet blood agar aerobically (method 3), and after preliminary incubation in an enrichment medium on a selective medium (method 4). Culture on blood agar incubated anaerobically was efficient and gave better results than aerobic incubation. The use of crystal violet blood agar did not significantly increase the yield of streptococci from carriers. Primary culture in sodium azide, crystal violet, blood agar enrichment medium, followed by subculture onto streptomycin and crystal violet blood agar, gave excellent results, but it is rather cumbersome for routine use.

The Lymphomata of the Gastrointestinal Tract. C. J. Uys. South African J. Lab. & Clin. Med. 4:235-248 (Dec.) 1958 [Cape Town].

The author uses the term "lymphoma" in a generic sense to embrace all neoplasms of lymphoid and reticuloendothelial origin. This group of neoplasms includes 2 benign lesions, namely, benign lymphoma of the rectum and giant follicular lymphoma; it also includes the following 4 malignant lesions: reticulum-cell sarcoma, lymphosarcoma, Hodgkin's disease, and plasmacytoma. The records of the pathology department of the University of Cape Town were searched for cases of lymphoma in which the primary lesion was in the gastrointestinal tract. Over the 6-year period from 1952 to 1957, inclusive, 21 primary gastrointestinal lymphomas were recorded, and 18 of these were classified as malignant. These 18 constituted 2.2% of 811 malignant tumors of the gastrointestinal tract seen during that period. Striking variations in localization were apparent. Lymphomas were commonest in the stomach and in the small intestine, but while the incidence of gastric lymphoma relative to other malignancies of the stomach was 2.5%, which is near the over-all figure, in the small intestine they constituted 41.2%. The esophagus, colon, and rectum, where carcinoma is common, are involved to negligible degree by lymphoma.

The presenting clinical features did not differ significantly from those of carcinoma of the same site. In the stomach, irrespective of microscopic appearances, ulcerative, polypoid, and infiltrating macroscopic types were observed; of these the ulcerative variety was commonest. In the intestine the neoplasms were either polypoid or diffusely infiltrating, and both types predisposed to intussusception. Histologically, 9 were classified as reticulum-cell sarcoma, 7 as lymphosarcoma, 1 as Hodgkin's disease, 1 as plasmacytoma, and 3 as benign lymphoma of the rectum. Attention is drawn to the entity "benign lymphoma of the rectum," which on gross appearance is indistinguishable from rectal polyp but which, histologically, may present diagnostic difficulties. Of the 14 patients followed up, only 6 have survived. One patient, alive 3 years after the operation, represents the longest survival. Excluding the benign form, mortality could not be correlated with any histological type, but 5 of the 8 patients who died showed involvement of the regional lymph nodes at the time of operation.

Studies on Bile Pigment in Bile: II. Clinical Considerations on the Bilirubin Content of Bile in Patients with Various Biliary Tract Diseases. T. Sato. Tohoku J. Exper. Med. 68:293-301 (Oct. 25) 1958 (In English) [Sendai, Japan].

While his associates at the surgical clinic, School of Medicine, Hirosaki University, studied the physical and chemical properties of bile during pathological states, the author investigated the bilirubin content in the bile of patients with various disorders of the biliary tract. His studies were made on 49 patients undergoing laparotomy: 11 patients with gallstones (8 with pigment stones and 3 with cholesterol stones), 5 patients with cholecystitis in the absence of stones, and 7 patients with ascariasis of the biliary tract; the remaining 26 patients were free from biliary tract disease and served as controls. The bile samples were obtained by puncture of the gallbladder during operation. The bile in the common duct was studied in 8 patients: 5 with gallstones, 2 with cholecystitis but without gallstones, and 1 with ascariasis of the biliary tract.

The total bilirubin content in the gallbladder bile of the 26 patients without biliary tract disease ranged from 85.5 to 1,890 mg. per 100 cc., its mean value being 799 mg. per 100 cc. Comparing these values with those of investigators who studied Caucasian subjects, the author concludes that the mean bilirubin content of the gallbladder bile of Japanese subjects is lower than that of Caucasians. The mean total bilirubin values in gallbladder bile of Japanese patients with diseases of the biliary aplasia of the erythroid precursors in the bone marrow. This man also had mild thrombocythemia of an obscure nature. His death was caused by viral hepatitis presumably resulting from blood transfusions. The second patient, a 64-year-old woman, presented with both a large benign thymoma and anerythroid anemia. In this patient removal of the thymic tumor was followed by complete hematological remission.

Five cases of thymoma with coexisting anemia were reported from 1928 to 1953. Since 1953 an additional 21 cases, including the 2 cases recorded here, have been reported. The clinical features of these 26 patients are analyzed. In 17 of the patients there was a virtual absence of reticulocytes in the peripheral blood and a selective aplasia of the erythroid precursors in the marrow without any other hematological abnormality. The remaining 9 patients had other hematological abnormalities, but the essential change in the bone marrow of 5 of these patients was absence of the erythroid series. Five of the 26 patients had myasthenia gravis in addition to the thymoma.

Since a causal relationship between benign thymic tumors and erythroid aplasia was suggested in previous reports, all cases of thymic tumor in adults seen at Memorial Center for Cancer and Allied Diseases since 1926 were reviewed. There was a total of 30 thymomas with pathological confirmation; 14 were true thymomas, and the others were malignant thymomas of the seminomatous type. Of the 14 patients with benign thymoma, the 2 described here were the only ones who had any degree of anemia. The incidence of myasthenia gravis among these 14 patients was the same. None of 16 patients with malignant thymoma had either this kind of anemia or myasthenia gravis.

Of 46 cases of selective erythroid aplasia reported in the literature, 26 (or 52%) of the patients had an associated benign thymoma. Of 16 patients with this syndrome who underwent thymectomy, 4 patients (including the second one mentioned above) obtained a complete hematological remission, and an additional 3 patients showed definite but incomplete improvement in the anemia. No histological criteria could be defined which were unique to thymomas associated with anerythroid anemia. The authors conclude that benign thymomas are associated with anerythroid anemia with approximately the same frequency as with myasthenia gravis. Therefore, any patient with benign thymoma should be kept under continuous hematological control. Since about half of the adult patients with anerythroid anemia have an associated benign thymoma, search for such a tumor is strongly indicated in any patient who presents this type of anemia. Although thymectomy only occasionally and unpredictably induces hematological remissions, it is the only effective procedure available. The pathogeneti
relating benign thymoma to anerythr
remain obscure.

Hemangiopericytoma of Stout and Murray

Coste, J. Uro and J. Guilaine. Presse méd.
2030 (Dec. 25) 1958 (In French) [Paris].

Hemangiopericytoma presents prognostic difficulty, because histological findings may suggest a benign lesion, whereas the medical observation reveals malignancy. It seems that the location of the primary lesion is decisive for the prognosis. The authors report a patient, 51 years of age, in whom a painless and apparently benign tumor, the size of a walnut, appeared on the upper margin of the right popliteal fossa in 1930 and had been quiescent for 20 years. The tumor began to expand in 1950, so that the circumference of the right thigh had been gradually increasing, but without accompaniment of pain. After 6 years of gradual growth on the part of the thigh tumor, pain appeared in the right side of the sacroiliac region, followed after a few months by the appearance of a tumor in the posterior iliac region. The new tumor had the same characteristics, but its growth progressed faster than that of the primary lesion. Roentgenologic examination in July, 1957, revealed osteolysis on the right side of the ilium. The pain grew worse, evolving into sciatic neuralgia a month later.

The tumor in the right thigh was voluminous and appeared to be a sarcoma at the time of the patient's admission. There was a marked venation under the skin of the tumor, and a slightly elevated local temperature. The tumor was not hard in consistency; several nodes were palpated under its skin, mostly in the region of the popliteal fossa. A murmur synchronous with the pulse was auscultated in the thigh. No abnormality of the adjacent lymph nodes was noted. A longitudinal band of indurated tissue, 5 to 6 cm. in length, was palpated in the anterior side of the thigh.

The tumor in the iliac region had features similar to those of the tumor in the thigh, including venation under the skin and a distinct pulsation. Roentgenologic examination revealed the band of indurated tissue under the skin of the thigh tumor and a considerable osteolysis on the right side of the ilium and of the sacroiliac joint, but the bones of the right leg were normal. Specimens of the thigh induration and of the tumor in the popliteal fossa were obtained by biopsy. The microscopic examination revealed that the induration in the anterior side of the thigh was an osteoma unrelated to the tumor in the popliteal fossa. The latter tumor was a whitish mass, well encapsuled, with surface venation, which was diagnosed as a nonmalignant hemangiopericytoma. This case demonstrates the incidence of a clinically malignant hemangiopericytoma, which malignancy could not be confirmed by histological findings.

The Use of Selective Media for the Detection of Beta-Haemolytic Streptococci. W. Brumfitt and P. L. Masters. J. Roy. Army M. Corps 105:38-41 (Jan.) 1959 [London].

The isolation of beta-hemolytic streptococci from the throats of healthy carriers and convalescent patients is difficult. Several techniques have been devised to improve the yield of streptococci. Because the authors were examining large numbers of throat swabs, they decided to compare some of these methods. Swabs from 2,000 soldiers not having sore throats were cultured on blood agar, aerobically (method 1), anaerobically (method 2), and aerobically with the addition of crystal violet to the medium (method 3). Swabs from 520 healthy children and adults were plated on blood agar aerobically (method 1), on crystal violet blood agar aerobically (method 3), and after preliminary incubation in an enrichment medium on a selective medium (method 4). Culture on blood agar incubated anaerobically was efficient and gave better results than aerobic incubation. The use of crystal violet blood agar did not significantly increase the yield of streptococci from carriers. Primary culture in sodium azide, crystal violet, blood agar enrichment medium, followed by subculture onto streptomycin and crystal violet blood agar, gave excellent results, but it is rather cumbersome for routine use.

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The total bilirubin content in the gallbladder bile of the 26 patients without biliary tract disease ranged from 85.5 to 1,890 mg. per 100 cc., its mean value being 799 mg. per 100 cc. Comparing these values with those of investigators who studied Caucasian subjects, the author concludes that the mean bilirubin content of the gallbladder bile of Japanese subjects is lower than that of Caucasians. The mean total bilirubin values in gallbladder bile of Japanese patients with diseases of the biliary tract were 33.8 mg. per 100 cc. in those with pigment stones, 131 mg. per 100 cc. in those with cholesterol stones, 84.8 mg. per 100 cc. in those with cholecystitis without gallstones, and 130.4 mg. per 100 cc. in those with ascariasis of the biliary tract. The bilirubin content in the common duct bile also decreased, the mean value being 72.2 mg. per 100 cc. Thus, the studies revealed that the bilirubin content of the gallbladder bile as well as the common duct bile was reduced during diseases of the biliary tract, and this trend was especially pronounced in patients with pigment stones. The author investigated not only the total bilirubin values but also the conjugated form and the free form, and the ratio of the conjugated to the total bilirubin content. He found that the conjugated form accounts for nearly 90% of the total bilirubin content of the bile, even in biliary tract diseases.

Serum Cholinesterase in Liver Disease. P. N. Wahi, S. Ramachandran and H. Navani. Indian J. M. Res. 47:13-19 (Jan.) 1959 [Kasauli, India].

The depression of the serum cholinesterase activity during the active phase of acute liver disease and its rise upon recovery have been reported by a number of investigators. It has been claimed that serial studies of this enzyme reflect the changing status of hepatocellular function in such patients better than do the other liver function tests. The present study was undertaken to determine the relative sensitivity of the serum cholinesterase test in comparison with 7 other liver function tests in patients with portal cirrhosis and infectious hepatitis. The following liver function tests were performed simultaneously: (1) thymol turbidity, (2) thymol flocculation, (3) zinc sulfate turbidity, (4) colloidal gold flocculation, (5) prothrombin concentration, (6) serum bilirubin, and (7) serum total proteins and albumin. The tests were made on 30 patients with portal cirrhosis, on 24 patients with infectious hepatitis, and on 30 healthy persons (hospital personnel and blood donors). Serum cholinesterase activity was diminished in all the patients with portal cirrhosis; that is, the serum cholinesterase tests proved far more sensitive than the other tests in indicating functional damage to the liver. In infectious hepatitis, however, the serum bilirubin test gave the highest percentage of positive results, while the determination of the serum cholinesterase proved to be no more sensitive than the turbidity and flocculation tests.

The studies also revealed a close relationship between serum cholinesterase and the serum albumin/globulin ratio, but no such relationship was found between the serum cholinesterase and the serum albumin itself. In some of the patients with infectious hepatitis low values of serum cholinesterase were found even when the serum albumin level was normal but the jaundice severe. This contradicts the observations of other investigators. Some other liver function tests, such as the prothrombin concentration and the colloidal gold flocculation, proved highly insensitive as indicators of functional liver damage and, as a result, are of little clinical value. The serum cholinesterase determination remains the best test for ascertaining mild degrees of functional impairment, at least in portal cirrhosis.

RADIOLOGY

Thromboembolism of the Lungs. J. Arendt and M. Rosenberg. Am. J. Roentgenol. 81:245-254 (Feb.) 1959 [Springfield, Ill.].

Based on roentgenologic findings in patients with thromboembolism of the lungs, examined in the radiologic department of Mount Sinai Hospital, Chicago, the authors emphasize that the incidence of this thromboembolism of either surgical or medical origin has remained high despite greater clinical awareness and better methods of prevention, vein ligation, and anticoagulant treatment. The clinical signs and symptoms are frequently suggestive. Roentgenography or angiocardiography is in a high percentage of cases decisive. Thromboembolism without infarction presents as an abnormal transparency of the involved lung segment (Westermark), with absence of one or both of the large hilar vessels. The heart shadow assumes a peculiar shape, best described as the "amphoric" type (resembling a Greek urn). In the absence of both hilar vessels (pulmonary arteries), a large saddle embolus must be considered.

A thrombus or embolus which is located slightly more peripherally within the main branches of the pulmonary arteries causes a buckling and aneurysmal widening of the vessel, with either a sharp cut-off or tapering at the peripheral end of the embolus. Such thrombus or embolus is compatible with life and leads to the development of either acute or chronic cor pulmonale. In contrast to the cor pulmonale of obstructive emphysema, the position of the diaphragm is elevated, the heart does not assume the vertical position, and within a short time enlargement of inflow and outflow tracts of the right ventricle develops.

Patients with thromboembolism leading to infarction do not, as a rule, present Westermark's sign of increased translucency of a lung segment, since it occurs mostly in a congested lung with dilated bronchial arteries and numerous collaterals. Infarction is common in patients with mitral stenosis, hypertensive heart failure, and coronary insufficiency. Infarcts represent an area of ischemic necrosis usually located at the periphery of the lung. They are rarely "wedge-shaped," as the apex of the wedge is cut off. A "truncated cone" or an "umbrella" shape results, which is quite characteristic. Smaller infarcts frequently have a cuboid or meniscus-like appearance. In the costophrenic angle the "hump-shaped" elevation on the medial side of a small pleurisy has frequently been observed and appears diagnostic. The base of the embolic infarcts is sometimes the interlobar fissure line, along which they form a parabolic shadow, which is best seen on a lateral roentgenogram.

The Importance of Chest Roentgenography in the Diagnosis of Pulmonary Embolism. G. N. Stein, J. T. Chen, F. Goldstein and others. Am. J. Roentgenol. 81:255-263 (Feb.) 1959 [Springfield, Ill.].

The authors report on 90 patients in whom a diagnosis of pulmonary embolism was made with the aid of clinical, laboratory, or autopsy findings at the Graduate Hospital of the University of Pennsylvania in Philadelphia between Aug. 1, 1955, and Jan. 31, 1957. Roentgenographic examination of the chest was secured after the onset of symptoms attributable to embolism in 72 of the 90 patients. Abnormal shadows were observed in the roentgenograms of 60 of these patients. Pleural effusions observed in 33 patients and homogeneous shadows resembling those produced by pneumonia and observed in 27 patients were the commonest findings. Elevation of the diaphragm was noted in 21 patients, usually in association with some parenchymal abnormality. Linear shadows, presumably representing focal areas of atelectasis or small interlobar effusions, were observed in 19 patients.

Shadows resulting from embolism appeared rapidly after its onset. Abnormal findings were observed as frequently in roentgenograms made within 24 hours of the onset of symptoms as in those made subsequently. Shadows resulting from embolism were slow to resolve. Abnormal findings cleared within a week in 5 patients and persisted for more than 4 weeks in 19 patients. The correct diagnosis was suggested by the roentgenologist in 10 patients in whom the possibility of pulmonary embolism had not been clinically considered. The diagnosis of embolism was suggested by him in only 39 patients (54% of the 72 patients). His failure to consider this diagnosis in the other patients must be attributed to misconceptions concerning the roentgenologic criteria for diagnosis of pulmonary embolism and lack of familiarity with the clinical manifestations of the disease. The alert roentgenologist will consider pulmonary embolism in the differential diagnosis of every acute cardiorespiratory illness. He will suggest this as a possibility in all patients with pulmonary and pleural shadows resembling pneumonia and pleurisy. Not infrequently, he will recognize characteristic roentgenographic patterns that will provide strong evidence for a diagnosis of pulmonary embolism even when typical clinical manifestations may be absent. The frequency with which pulmonary embolism is clinically diagnosed depends largely on the frequency with which the roentgenologist calls attention to the possibility of this disease.

Treatment of Thyrotoxicosis with ^{131}I: A Review of 500 Cases. G. W. Blomfield, H. Eckert, M. Fisher and others. Brit. M. J. 1:63-74 (Jan. 10) 1959 [London].

The authors describe the results obtained in 500 thyrotoxic patients (398 women and 102 men) treated with radioiodine (I^{131}) in two centers in Sheffield from 1949 to 1958. The following groups were regarded as suitable for treatment with I^{131}: (1) patients over 45 years of age; (2) younger patients in whom there is associated disease, particularly cardiovascular complications, probably reducing the life expectancy to less than 20 years; (3) patients who have relapsed after thyroidectomy; (4) patients who have not remained euthyroid after a course of treatment with antithyroid drugs or have shown toxic reactions to these drugs and who are considered unsuitable for or have refused partial thyroidectomy. Pregnancy is a complete contraindication for this form of treatment.

The intention was to deliver about 7,000 rads in the treatment of the patient with uncomplicated thyrotoxicosis. A slightly greater dose was chosen for patients with severe hyperthyroidism, nodular glands, or disabling cardiac complications. It was regarded as advisable to give slightly smaller doses in the treatment of patients with postoperative recurrences and milder cases with small smooth glands. The calculation of the number of millicuries of I^{131} to be given to the patient to provide the intended rad dose to the thyroid depends on the size of the gland and the proportion of the dose taken up by and retained in the gland. A preliminary tracer test with I^{131} was made, and the uptake at 48 hours was measured to forecast the anticipated uptake of the therapy dose. The formula used in the calculation was explained in an earlier report. The mass of the thyroid was estimated from the results of palpation by several experienced observers. The patients were seen at the thyroid clinic monthly for 2 months after therapy and thereafter at longer intervals. A repetition of treatment was not considered so long as any improvement was noticeable, and at least 3 months had to elapse after the first treatment before a new treatment was given.

After the first treatment 59% of the patients patients became euthyroid and 10% hypothyroid. A further 21% became euthyroid after 2 or more treatments. Hypothyroidism occurred in all in 12% of the patients. A study of the factors that influence the response to treatment revealed that the gland size was the most important, but this was difficult to determine accurately. Hypothroidsm occurred most frequently in patients with small glands, the size of which was probably overestimated. The age of the patient and wide variations in the uptake and the half-life of I^{131} in the thyroid did not have any consistent effect on the clinical result. Patients with tracheal compression or distortion due to thyroid enlargement were treated. No symptoms due to tracheal compression occurred after therapy, and the subsequent shrinkage of the gland restored the tracheal abnormality towards normal. The irradiation dose to the plasma was calculated for the younger patients. The mean plasma dose was 25 rads, but this was greatly exceeded in a few of the patients receiving 2 or more treatments. Several normal pregnancies occurred after therapy.

Thirty of the 500 patients had died at the time of the completion of this review. In 18 patients death was due to cardiovascular disease; in 4 the cause was carcinoma; and in the remaining 8 death was predominantly due to respiratory infections. The carcinomas responsible for death were in the breast, ovary, rectum, and thyroid. The patient with carcinoma of the thyroid died 9 months after treatment.

Malignant Irradiation for Benign Conditions. B. Cannon, J. G. Randolph and J. E. Marray. New England J. Med. 260:197-202 (Jan. 29) 1959 [Boston].

Some of the disabling and life-endangering consequences of the use of irradiation in the treatment of benign conditions are discussed on the basis of 165 cases from the records of the Massachusetts General Hospital in Boston and from personal files. In many patients it proved impossible to ascertain the exact dosages of irradiation administered, because the treatment was given many years ago by physicians who have died or whose records are either incomplete or unavailable. In professional workers the exposure was in small amounts during a period of many years. Clinical and pathological evidence of chronic irradiation damage in the diseased tissues was enough to incriminate the irradiation exposure as a major factor in the changes observed.

In the 32 patients who had received irradiation (usually multiple treatments) for plantar wart, the average time lapse from exposure to surgical treatment was 5½ years. Nineteen patients with abnormal skin conditions (eczema, psoriasis, lichen planus, and the like) treated with x-rays had severely injured skin and soft tissue. The mean latent period between exposure and skin breakdown in these patients was 14 years. The average time lapse before surgical treatment was requested by 14 patients who had received irradiation in infancy for isolated hemangiomas was 20 years. In 12 patients tissue damage resulted from irradiation for the removal of unsightly hair. This method of epilation was popular about 30 years ago, and its damaging effects are still being observed.

The sequels of irradiation for acne were especially deplorable, since cancer developed in 9 out of 10 patients. A number of other patients with acne scars gave a history of roentgen-ray irradiations. They are not included in this report, because surgical treatment was not recommended, but there is evidence that neoplastic changes can be anticipated in their skins. A number of other patients had received roentgen-ray irradiations sufficient to produce skin damage for such lesions as Dupuytren's contracture, pruritus, pulmonary tuberculosis, goiter, rheumatism, spondylitis, furuncle, gallbladder colic, and cervical adenitis.

Cancer was found in 36 of 165 patients (22%). The interval between irradiation exposure and the establishment of a diagnosis of cancer ranged from 5 to 50 years. In 5 cases the interval was over 40 years. Cancer may still develop in patients more recently exposed. Fourteen of the 36 cancers were of basal-cell type. This is contrary to the accepted teaching that only epidermoid carcinoma is found in irradiated areas. With one exception, a physician's hand, all basal-cell lesions occurred on the face. Surgical therapy should be prompt and thorough, since only by prophylactic excision of all severely injured skin can the malignant transition be avoided. Seventy-six of the 165 patients were presumably cured after one surgical procedure. An additional 15 patients required a second excision. The remainder needed multiple operations.

Some Observations on the Treatment of Radio-Resistant Tumours. G. E. Flatman. J. Fac. Radiologists 10:21-26 (Jan.) 1959 [Bristol, England].

While generally the histological picture indicates the likely degree of radiosensitivity, there are cases in which it is impossible to prejudge what control irradiation will achieve. A well-known example of this variation is the squamous-cell carcinoma of the tongue, a tumor of moderate radiosensitivity which occasionally proves to be completely radioresistant. Conversely, a proportion of the so-called radioresistant tumors, for example, soft-tissue sarcoma, will respond to irradiation. Supervoltage treatment techniques, which have become available in recent years, make possible the delivery of higher tumor dosages with less damage to surrounding normal tissues and minimal constitutional upset. Evidence is now available showing that some of the so-called radioresistant tumors can be effectively treated by irradiation.

At Mount Vernon Hospital, Northwood, England, many of these tumors have been irradiated—in the past by conventional irradiation techniques, and during the last 4 years by means of either the

4-megavolt linear accelerator or the 1,500-curie Theratron cobalt unit. Irradiation was carried out (1) when there was evidence that surgery alone would not cure the patient, (2) when surgery was impossible on account of the size or situation of the tumor, and (3) when palliation seemed possible despite the advanced state of the tumor. The histories of 7 patients who were treated either by irradiation alone or by combined irradiation and surgery illustrate the value of radiotherapy in the management of some of the radioresistant tumors. A tumor dose of 5,000 r was applied over 5 weeks in the form of deep x-ray treatment (250 kv.) to an osteogenic sarcoma involving the head, neck, and lesser trochanter of the left femur of a 27-year-old woman (case 1). This produced symptomatic relief, but recalcification was slow, and a year later a further dose of 3,500 r was given. After this second course of treatment the bone sclerosed. Later a necrotic ulcer resulting from external trauma made surgery necessary, and histological examination of the operation specimen failed to reveal any viable tumor cells.

In a 41-year-old man (case 2) a spindle-cell sarcoma at the site of operation in the fibula was irradiated with the Theratron cobalt unit to a dose of 7,500 r. A roentgenogram taken 7 months after completion of treatment showed sclerosis of the affected bone with diminution in size of the soft-tissue mass. The patient was symptom-free 18 months later. In a 2-year-old girl (case 3) a fibrosarcoma of the right antrum was treated by means of the linear accelerator to a tumor dose of 7,900 r. More than 12 months after this treatment, the child was free from active disease.

A fibrosarcoma at the back of the thigh of a 69-year-old patient (case 4) was irradiated with the Theratron cobalt unit; 3,400 r was given in 4 weeks, and after 3 weeks' rest a further 4,500 r was given in 6 weeks. The tumor diminished in size, but subsequently broke down, and guillotine amputation was carried out. Examination of 18 blocks of the tumor failed to reveal any viable cells. The patient was still well 3 years later. Chordomas have been successfully treated by irradiation. This is illustrated by the history of a 69-year-old woman (case 5) in whom a sacral chordoma has been controlled by irradiation at both conventional and megavoltages for over 6 years.

Case 6 was that of a 21-year-old man with a large tumor of the right buttock. A year before a small, supposedly benign tumor had been removed from the same site. Biopsy of the recurrence showed it to be a chondrosarcoma. Irradiation was given with the linear accelerator. Later, aspiration of fluctuant material and nitrogen mustard treatment were carried out, and the patient could return to work. A 33-year-old woman with an irremovable carcinoma of the cecum (case 7) received irradiation with the Theratron cobalt unit. This reduced the size of the tumor, so that subsequent resection became possible. The patient was still free from recurrence 18 months later.

BIOCHEMISTRY

Biochemical and Hormonal Changes in Human Beings After Implantation of Yttrium 90 into the Sella Turcica. G. M. Molinatti, A. Pizzini, F. Camanni and others. Minerva med. 40:4014-4021 (Oct. 27) 1958 (In Italian) [Turin, Italy].

Biochemical and hormonal changes related to functional change of the pituitary body were studied in 34 patients with various types and different locations of neoplastic disease after implantation of radioyttrium (Y^{90}) into the sella turcica. A thorough study in time was possible in only 15 patients. The level of urine chorionic gonadotropin decreased in a few patients from 10 to 15 days after implantation of Y^{90}, whereas no change was observed in the remaining patients. No manifest change in the serum inorganic phosphorus level took place either immediately or several months after the operation, although many patients had osseous metastases. Concentration of iodized proteins in plasma showed diminished function of the thyroid gland in 7 patients in a week and in 3 patients from 40 to 60 days after implantation of Y^{90} into the sella turcica. Hypothyroidism was confirmed with the functional test of radioiodine (I^{131}). Increased total serum cholesterol levels were correlated with decreased concentrations of iodized proteins in plasma. Changes in the levels of the urinary 17-ketosteroids and 17-OH corticosteroids indicated a decrease of the function of the adrenal cortex in 6 patients of both sexes 2 weeks after the implantation of Y^{90}. Chromatographic determination of urinary 17-ketosteroid levels suggested a decrease of both gonadal and adrenal functions in 3 patients. Polyuria accompanied by hyposthenuria appeared in several patients from 3 to 5 days after implantation of Y^{90} and disappeared 2 weeks later.

Implantation of Y^{90} into the sella turcica induced an almost total functional insufficiency of the pituitary body in 8 patients (50%). The main clinical effect of the implantation was an acute hypoadrenia, which appeared within 2 weeks of Y^{90} therapy. This disorder was corrected by administration of large doses of cortisone or hydrocortisone. Myxedema developed in 2 patients, and a mild variety of hypothyroidism in another 2 within 50 to 60 days of Y^{90} therapy. Position of the implanted rods of Y^{90}, rather than their numbers, appeared to be important for the radioactive effect of Y^{90}. When the rods were lying on the

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external surface of the pituitary, necrosis of the gland was incomplete. Necrosis was almost complete if the rods were inserted into the pituitary. No cell regeneration of residual parenchyma was observed either soon afterward or after 6 months in instances in which partial necrosis of the pituitary body took place. Hypofunction of the pituitary remained unaltered. This study revealed that implantation of Y^{90} into the sella turcica induced in most patients a clear functional insufficiency of the pituitary body.

The Study of the Properdin System of the Body. A. A. Bagdasarov, R. A. Rutberg, I. L. Chertkov and others. Prob. Hematol. & Blood Transfus. (Translation from the Russian.) 3:69-73 (no. 2) 1958 [New York].

The properdin system, a new system of natural immunity recently discovered by Pillemer, consists of the serum protein properdin, magnesium ions, and 4 components of complement. The authors have made active preparations of properdin and of the yeast constituent zymosan, which reacts easily with properdin, and also of the reagents RP (serum deprived of properdin but retaining its complementary activity) and R_3 (serum deprived of the third component of complement [C_3] but retaining the activity of the 3 remaining components of complement); this made it possible to study the blood properdin level in man and animals in the normal state and in various pathological conditions. In the serum of healthy human donors, the properdin titer varied from 4 to 12 units per cubic centimeter (on the average 8 units per cubic centimeter). These results agree with those obtained by Pillemer; thus, the correctness of the authors' method for determining the activity of properdin and also the suitability of zymosan, RP, and R_3 for its titration were confirmed.

The properdin content was studied in 22 patients with various hematological diseases (acute leukemia, leukosarcoma, chronic granulocytic leukemia, lymphocytic leukemia, hypoplastic and aplastic anemia, and hemolytic anemia). No change was detected in the level of properdin in the blood of these patients. The only exceptions were patients with acute leukemia; in 2 patients examined, properdin could not be found. It may be that the disappearance of properdin in these patients was due to their poor general condition. No increase in the blood properdin content was found in 2 patients with paroxysmal nocturnal hemoglobinuria; the blood properdin level in one of these patients, who was severely ill with pronounced hemolysis, was lower (4 units per cubic centimeter) than in the other patient with a milder form of the disease (8 units per cubic centimeter).

In experiments on dogs and rats in which th properdin level in the blood was determined before and after irradiation with roentgen rays changes in the activity of the properdin system were observed, which confirmed those reported by Pillemer in animals with acute irradiation sickness. In 25 patients with chronic irradiation sickness developing as a result of radiotherapy fo malignant neoplasms, the blood properdin tite was determined; it was found to be within normal limits (4 to 12 units per cubic centimeter) i 24. In only one patient was the properdin conten in the blood lowered to 2 units per cubic centimeter. This lowering could hardly be attribute to irradiation sickness, since in this patient th disease was not severe. It may be assumed tha the lowering of the properdin content in this patient was due to the trauma of a surgical operatio not long before the determination of the properdi in the blood.

Serum Cholesterol in Man: Diet Fat and Intrinsic Responsiveness. A. Keys, J. T. Anderson an F. Grande. Circulation 19:201-214 (Feb.) 1959 [New York].

The serum cholesterol concentration in ma is strongly influenced by both the amount an the kind of fat in the diet, and it is necessary t distinguish among 3 classes of fatty acids, namely, saturated, monoenoic, and polyenoic. Data obtained from a number of dietary experiments i man yielded a formula by which the response in the serum cholesterol level to changes in die can be predicted. The reliability of this formula was tested by the authors on 24 stabilized schizophrenic men who were physically healthy an were maintained on a regimen of constant activity The effects of various types of fatty acids on th serum cholesterol levels of these men were studied. The results of controlled dietary experiment performed on these men justified the following conclusions: 1. In man, oleic acid glyceride in th diet is the equivalent of equal calories from carbohydrate with respect to the effect on the serum cholesterol level. 2. The glycerides of saturated fatty acids in ordinary food fats raise the serum cholesterol level and the glycerides of unsaturated fatty acids (mainly linoleic acid) lower it; in thi respect it requires slightly more than 2 Gm. o linoleic acid to offset the effect of 1 Gm. of a saturated fatty acid, such as stearic or palmitic acid 3. Intrinsic relative hypercholesteremia is generally associated with relative hyperresponsiveness to dietary fat changes. 4. These relationships allow reasonably accurate predictions of group average responses in serum cholesterol level to given changes in dietary fats.

BOOK REVIEWS

Don't Worry About Your Heart. By Edward Weiss, M.D. Cloth. $3.95. Pp. 203. Random House, Inc., 457 Madison Ave., New York 22; Random House of Canada, Ltd., 1149 King St., W., Toronto 2, Canada, 1959.

Within the past few years numerous books have been written for laymen who suffer from heart attacks or who have relatives with heart diseases. Some of these have been factual without being interesting, some have been alarming, and some have been written from a biased or faddist viewpoint. A few have been informative, reassuring, and written in such a manner as to be readable and helpful for the patient. This author has approached the problem largely from the viewpoint of the patient and his fears and anxieties. His notable experience in the field of psychosomatic medicine is clear in his presentation. After the introductory chapters succeeding sections of the book cover anxiety and the normal heart, high blood pressure and its management, and anxiety and the diseased heart. The last section includes chapters on coronary heart disease; work, worry, and heart disease; sexual problems and heart disease; the "anniversary" reaction; reactions to heart attacks; valvular heart disease; the psychology of heart surgery; and a brief chapter on cerebral vascular disease. Although there are numerous references to treatment of the organic aspects of heart disease and high blood pressure, the author has concentrated on the question of the relationship of emotion to heart disease. His style is lucid and readable, and he has illustrated his points with many brief case histories. Most patients should find this book helpful and reassuring.

Fracture Surgery: A Textbook of Common Fractures. By Henry Milch, M.D., and Robert Austin Milch, M.D. With chapter on anesthesia by Herbert D. Dubovsky, M.D., Director of Anesthesiology, Easton Hospital, Easton, Pa. Cloth. $17.50. Pp. 470, with 671 illustrations. Paul B. Hoeber, Inc. (medical book department of Harper & Brothers), 49 E. 33rd St., New York 16, 1959.

This book is divided into four major sections. Most of the illustrations are reproductions of roentgenograms, and a large proportion of these present complicated reconstructive problems. Diagrammatic illustrations would have been more forceful for the teaching of students and young surgeons. In the preface the authors state that the book makes no pretense of being either a roentgenographic atlas or a complete treatise on fractures. The problems discussed are thoroughly covered, with the inclusion of more than one solution in most instances. The terminology used in certain chapters is not in common usage in many medical centers.

Chapter 8 is entitled "Compound Fractures"; most orthopedists are now using the term "open fractures" for this problem. In the text, the terms "open" and "compound" are both used. The chapter on axial malalignments is beautifully written and illustrated, but it would have been more effective if the terminology used for the various types of deformities had been directly correlated with the more common nomenclature. Many of the chapters include roentgenographic illustrations of successful reconstructive operations for malunion or nonunion. Only occasionally is there a specific presentation of the operation recommended. The bone graft procedure for persistent nonunion of the tibia, as illustrated in figures 428 and 429, is an exception. Many of the diagrammatic illustrations have been previously published, either in medical journals or by commercial instrument companies. This textbook should be of interest to surgeons with a substantial background in orthopedic and traumatic surgery. It does not appear to be a practical textbook for students or young orthopedists, except as a background reference for certain specific subjects.

Principles of Gynaecology. By T. N. A. Jeffcoate, M.D., F.R.C.S., F.R.C.O.G., Professor of Obstetrics and Gynaecology in University of Liverpool, Liverpool. Cloth. $15; 75 shillings. Pp. 669; 27, with 436 illustrations. Butterworth & Co. (Publishers) Ltd., 88 Kingsway, London, W. C. 2, England; 1367 Danforth Ave., Toronto 6, Canada, 1957.

This book is intended primarily for the undergraduate, but its complete coverage should make it of value to the hospital resident and general practitioner. It is an exceptionally comprehensive, lucid, and practical presentation, with particular emphasis on the psychological and medical rather than the surgical aspects of obstetrics and gynecology. A wide range of subjects is covered, including history-taking, ovarian function, infertility, backache, pregnancy, abortion, and dysmenorrhea and other gynecologic conditions, not only from the pathological aspects but also from the emotional side. Neglected areas such as hysterectomy and its aftermath and preoperative and postoperative management are emphasized. There are excellent sections on female urology and proctology. The pathology of menstruation, breast function, and tumors of the reproductive tract is described in detail. Ample illustrations are provided. Intersexuality, pseudohermaphroditism, and neuroendocrinologic changes involving ovulation and menstruation are adequately covered. The text contains sound premarital advice and discusses contraception and

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These book reviews have been prepared by competent authorities but do not represent the opinions of any medical or other organization unless specifically so stated.

marital guidance. It is meant to add to, rather than replace, clinical instruction so that the student will not have to cull the literature. The focus is narrowed to the nonsurgical aspects of gynecology, because these far exceed the surgical problems encountered. This presentation emphasizes the art as well as the science of gynecology. It is highly recommended for the student, the general practitioner, and even the specialist.

Pain. By Harold G. Wolff, M.D., Professor of Medicine (Neurology), Cornell University Medical College, New York City, and Stewart Wolf, M.D., Professor and Head, Department of Medicine, University of Oklahoma School of Medicine, Oklahoma City. Publication number 333, American Lecture Series, monograph in Bannerstone Division of American Lectures in Physiology. Edited by Robert F. Pitts, M.D., Ph.D., Professor of Physiology and Biophysics, Cornell University Medical College. Second edition. Cloth. $4.25. Pp. 121, with 20 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1958.

The authors have added a few new items of practical value which were omitted in the earlier edition. The current edition is in the nature of a brief synthesis, reflecting current thinking about pain from the viewpoint of some of the important developments in the past. The book also is designed to be of use to students and practitioners who are confronted with day-to-day problems in the diagnosis and management of painful conditions. Drs. Wolff and Wolf are authorities on the subject of pain, and this book presents a point of view not commonly recognized by physicians and others who must somehow overcome problems of pain. This book should greatly benefit the physician who must deal with such problems and, indirectly, should have some useful results for the patients as well. It is printed on good paper and is easily read. It is indexed and contains an excellent up-to-date list of references on all the various aspects of the problem of pain.

Trauma and Disease: Selections from the Recent Literature. Edited by Alan R. Moritz, M.D., Professor of Pathology and Director of Institute of Pathology, Western Reserve University, Cleveland, and David S. Helberg, J.D. Cloth. $17.50. Pp. 903. Central Book Company, 850 De Kalb Ave., Brooklyn 21, N. Y., 1959.

This volume consists of previously published articles which are reprinted in part or in their entirety, with some explanatory or critical editorial comments. As they frankly admit in their introduction, "the editors have undertaken this republication of the writings of others, dealing with trauma in the causation of disease, with considerable misgiving. Frequently, in our opinion, the evidence presented by the author did not warrant the conclusions drawn from it. Frequently, we were not sufficiently familiar with the subject matter under discussion to be able to judge either as to the adequacy of the evidence or as to the validity of the conclusions drawn from it." The editors believe, however, that these difficulties are at least partially compensated by the fact that many of the articles which they reprint "represent real advances in the field of legal medicine and will almost surely serve to improve the quality of justice in the evaluation of personal injury cases." A large portion of the collection is devoted to articles on stress, but it is presumably owing to the editors' emphasis on problems of jurisprudence that the somatic aspects of stress and the general adaptation syndrome, as well as the biochemical basis of the diseases of adaptation, have been neglected at the expense of legal considerations and the discursive treatment of emotional stress factors. Unfortunately, the volume is not provided with an index, which makes orientation in this large book difficult.

Essentials of Human Reproduction: Clinical Aspects, Normal and Abnormal. Edited by Joseph Thomas Velardo. Contributors: Robert W. Brown, M.D., and others. Cloth. $13.50. Pp. 270, with illustrations. Oxford University Press, 417 Fifth Ave., New York 16, 1958.

This volume represents the collaborative efforts of 13 physicians and research workers in the field of clinical endocrinology to present both the normal and abnormal aspects of human reproduction. After a general introductory chapter on sex hormone relationships the topics discussed include ovulation, menstruation, endocrine changes during pregnancy, disturbances of pregnancy, gynecologic disorders, and infertility. Other chapters are devoted to the anatomy and physiology of the placenta and to endocrine disorders in the male and female reproductive organs. The material is well integrated and each topic is covered in a comprehensive and up-to-date manner. Each chapter concludes with an extensive bibliography and the text is liberally illustrated with excellent reproductions, including both photomicrographs and color plates. This book can be recommended as an authoritative text in the field of human reproduction.

Practical Clinical Biochemistry. By Harold Varley, M.Sc., F.R.I.C., Biochemist, Manchester Royal Infirmary, Manchester, England. Second edition. Cloth. $6.50. Pp. 635, with illustrations. Interscience Publishers, Inc., 250 Fifth Ave., New York 1; William Heinemann, Ltd., 99 Great Russell St., London, W. C. 1, England, 1958.

In the three years since the publication of the first edition of this book on clinical biochemical tests and interpretations enough new information has become available in this field to warrant extensive revision and the publication of a new edition. The chapters on hormones and proteins have been greatly expanded and rewritten, and new sections on hydroxyindoles, transaminases, and mucoproteins have been included. Newer developments in analytical techniques have been added in many chapters throughout the book. The arrangement of the chapters and the presentation of material within each chapter closely follows that of the first edition. Reference is made to recent American and English literature.

QUESTIONS AND ANSWERS

LOW BACK PAIN

To the Editor:—*A company physician for an organization that manufactures heavy farm equipment is faced with the problem of low back pain in employees who do heavy manual labor. How can the company be protected against alleged liability for low back injuries? What are the pros and cons of obtaining a roentgenogram of the lumbosacral spine as part of the preemployment examination?*

Marion M. Sumner, M.D., Hutchinson, Kan.

Answer.—It may be presumed that the goals of the inquiring physician are to help prevent back injuries for the sake of the welfare of the employees and to help assure that the company by which he is employed is held liable only for true disability suffered as a result of employment. With respect to the prevention of back injuries, the physician is in a position to contribute, although for a truly effective program with this goal there must be an effort on the part of supervisors and safety personnel to accomplish the educational efforts and rearrangement of work procedures indicated to minimize the likelihood of back injuries. The physician's principal opportunity in preventing such injuries is the chance that he has to advise against the placement or continuation in any work involving back strain of an applicant for employment, or an employee, whose medical history, physical examination, or (if obtained) roentgenograms indicate a decreased fitness for work requiring a healthy back. A complete history and physical examination will often reveal a lack of fitness with respect to the back. X-raying the lower portion of the back of those who are to do heavy work often reveals contraindications to such work when the medical history and physical examination were nonrevealing in this way.

The major criticisms of preplacement x-ray examinations of the back have usually been concerned with radiation exposure or with the interpretation of, and action taken on the basis of, positive findings. With respect to the first of these problems, it is true that an applicant for employment in a position involving heavy labor who is so x-rayed and not employed because of a positive finding might possibly seek other work and have back x-rays performed by a number of other potential employers within a relatively short period of time. Some steps that might minimize this likelihood suggest themselves, and the risk involved in it must be weighed against the risk of significant back disabilities which might result from failure to detect contraindications to heavy work.

With respect to the second, some physicians have counseled against the employment of persons who have positive findings on roentgenograms of the back, the significance of which is limited and which would probably not truly influence the applicant's fitness for heavy labor (such as a small spina bifide occulta). Where this has occurred, early in the use of such roentgenograms in the railroad industry for example, it has probably resulted from the conviction of those involved that any positive roentgenographic finding in a case which is the subject of subsequent litigation unjustly influences awards made and even seems to result in the making of awards when no other evidence of an injury or of disability can be demonstrated.

With respect to the prevention of fraudulent claims and avoiding the placement in heavy work of persons who are not aware of or who conceal significant back disease or previous injuries, it seems self-evident that roentgenograms of the lumbosacral spine can be useful. As a matter of perspective, however, one must keep in mind the debatability of endorsing the employment for heavy work of a man with a back which is perfect roentgenologically but whose past behavior has revealed evidences of irresponsibility or perhaps even lack of integrity, while counseling against employment of an honest, responsible, properly motivated man who might even have a history of athletic activities, military service, and previous heavy labor without ill effects but who happens to have a roentgenologic finding of doubtful significance. In recent years, a number of helpful reports on this subject have appeared. One which illustrates impressively favorable results enjoyed largely on the basis of preplacement x-ray examinations of the lower part of the back is that by Becker (*Indust. Med.* 24:486, 1955).

CAPILLARY INTEGRITY

To the Editor:—*How can a capillary hemorrhage be differentiated from the simple passage of the blood cells through the walls of the capillaries?*

Aaron N. Gorelik, M.D., New York.

Answer.—Normally the integrity of the capillary wall does not allow the passage of red blood cells. Several factors, such as inflammation and platelet deficiency, damage the integrity of the capillary wall and allow free passage of erythrocytes into the surrounding tissue. The degree of damage to the capillary wall is one of the factors determining

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The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any medical or other organization unless specifically so stated in the reply. Anonymous communications cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

the size of the hemorrhage. Presence of petechiae characterizes the abnormality of the capillary wall. Such small hemorrhages can readily be seen if they are present on the skin, mucosa, or eye grounds. Microscopic examination of tissue is necessary to determine the degree of hemorrhage, if present, in tissues or organs.

INFECTIOUS HEPATITIS

To the Editor:—*The wife of a patient who had infectious hepatitis received an injection of gamma globulin. Although she was free of symptoms and had no jaundice, results of the laboratory tests done the next day were reported as follows: serum glutamic oxalacetic transaminase level, 485 units, and serum bilirubin level, 0.7 mg.%. Six days later the transaminase level was 400 units, serum bilirubin level 0.3 mg.%, and cephalin flocculation 2+ after 24 hours and 2+ after 48 hours. Thirteen days after the first test the serum glutamic oxalacetic transaminase level was 185 units and the thymol turbidity 3.4 units. The patient was confined to bed for 14 days. She has remained well since then (24 days). If it is agreed that this patient had an enzymatic rather than a subclinical form of infectious hepatitis, should she be treated with bed rest, diet, and similar measures until the enzyme levels have returned to normal values? Should she be considered to be a carrier and therefore be isolated? In turn, should those who had close working association with her receive similar attention? Would the routine use of enzyme studies in household contacts be of value in curbing the spread of infectious hepatitis?*

Fritz F. Blumenthal, M.D., Middletown, N. Y.

Answer.—It would seem likely that this patient did have acute hepatitis and that she should be treated in the usual fashion until results of the serum transaminase and sulfobromophthalein retention tests are normal. It is likely that she was a carrier during the acute phase of disease and possibly longer, and so the usual enteric precautions are recommended. Those persons in close working association with her at the time might profit by receiving normal human gamma globulin. This consultant believes that the routine determination of serum transaminase level in household contacts would be of value in detecting subclinical cases of hepatitis.

Answer.—The term "enzymatic" form of infectious hepatitis is open to serious question. The use of this term would imply that the entity was a derangement of enzymes rather than damage by a virus to liver cells. In view of the danger of patients with asymptomatic infectious hepatitis developing a fulminant and fatal form of the disease or postnecrotic cirrhosis, it would be well for neither the physician nor the patient to be lulled false security. The absence of jaundice and symptoms would not preclude this patient from consideration as having a case of infectious hepatitis. If symptoms were present, the case would be one of anicteric or nonicteric infectious hepatitis. Both the asymptomatic and nonicteric forms of infectious hepatitis would be considered subclinical and would depend on results of laboratory tests for the diagnosis.

From the findings on serial determinations of the transaminase level it could be assumed that this patient had recent hepatocellular damage. The serum bilirubin level and thymol turbidity were normal and the cephalin flocculation of 2+ is of questionable significance. The diagnosis of asymptomatic or subclinical hepatitis in this case depends on the knowledge of intimate contact with a person with an obvious case of infectious hepatitis and the persistently elevated serum transaminase levels. Because of the relatively high initial serum transaminase level (485 units), bed rest for two to three weeks and a nutritious diet would be good treatment. At the end of this period, if there were no symptoms and the transaminase level had stabilized (not necessarily returned to normal), the patient could be made ambulant. Subsequent serial determinations of the transaminase level should not reveal an elevation of more than 50 units. An elevation of 50 units would indicate the need for further bed rest.

The patient should definitely be considered a carrier and special precautions taken with respect to stools, venipuncture, and parenteral treatment of any kind. Inasmuch as proof that a person is a carrier can be established only by the injection of blood into human volunteers or by the ingestion of properly prepared material from the feces by such volunteers, all persons working in close association with the patient should be considered as potential carriers and as possibly having subclinical cases. If feasible, liver function tests, including enzyme studies, should be done to determine the clinical status of these persons. It would also be well to give each of these contacts an injection of gamma globulin, which may abort the disease even during the incubation period. The routine use of enzyme studies would be of definite value in helping to identify whether household contacts suffer from the asymptomatic or nonicteric form of infectious hepatitis. Such identification with subsequent administration of gamma globulin would protect these persons. In addition, investigation of the water, food, and milk supply, as well as sanitary measures in the disposal of feces, would be of value in curbing the spread of infectious hepatitis.

WESSON OIL

To the Editor:—*Is Wesson oil hydrogenated?*

M.D., New Jersey.

Answer.—Wesson oil is a liquid vegetable oil made from cotton seed. It is not hydrogenated. It contains 50% linoleic acid and 25% oleic acid.

WASHINGTON NEWS

Loan Insurance for Nursing Homes . .

International Medical Research Program Approved . .

Witnesses Urge PHS Radiation Safety Role . .

Increase Reported in Poliomyelitis . .

Va Receives Funds for Patient Care . .

HOUSE ACTS ON LOAN INSURANCE FOR NURSING HOMES

Both of the catch-all housing bills offered to the House in the session's first major fight over economy in government contained loan insurance provisions aimed at stimulating construction of proprietary nursing homes.

The House, voting mainly on party lines, cleared the 2.1-billion-dollar Democratic housing bill by a 261 to 160 tally despite warnings by Republicans that the President might veto it.

The floor action came after the House Rules Committee, which had held up for weeks a measure cleared by the House Banking Committee, finally voted eight to four to allow consideration by the full House. However, the bill was sent to the floor under a procedure allowing a substitute and less costly measure to be offered as an alternative.

The administration promptly endorsed the substitute, sponsored by Rep. A. S. Herlong Jr. (D., Fla.) and backed by most Republicans in the House.

The sections of both bills dealing with proprietary nursing homes were identical. A Senate-approved housing bill contained a somewhat different nursing home provision. A conference committee composed of top members of the House and Senate Banking Committee had the responsibility of working out differences between the Senate and House versions of the housing legislation.

The House and Senate bills authorized the Federal Housing Administration to insure loans for construction or improvement of private nursing homes. Under the House version individual loans up to 1 million dollars but not to exceed 75% of the cost of the installation could be insured by the agency. The Senate measure provides that individual loans up to $12,500,000 and not over 75% of the cost could be insured.

State Hill-Burton authorities, who supervise the program of federal grants to help hospital construction, would pass on the eligibility of nursing homes for the mortgage guarantees. However, the Senate voted to allow nursing homes rejected under this procedure to appeal to the FHA. There was no appeal provision in the House measures.

The American Medical Association has supported the nursing home provisions.

The most controversial issue was public housing. The committee bill called for an expanded program of federal construction of low-cost housing units. The Herlong bill did not provide for any new units.

The substitute bill provided about 1.3 billion dollars for various housing programs, compared to more than 2 billion dollars in the committee bill, which opponents contended would throw the budget out of balance.

SENATE CLEARS INTERNATIONAL MEDICAL RESEARCH BILL

The Senate approved and sent to the House the measure setting up a new National Institute for International Health and Medical Research. The outcome was a foregone conclusion, since 64 senators of both parties had sponsored the measure.

The new Institute would bring to eight the number of branches of the National Institutes of Health, a part of the Public Health Service.

The bill, introduced by Sen. Lister Hill (D., Ala.), chairman of the Senate Labor and Public Welfare Committee, authorizes $50,000,000 annually for the international program. It seeks to encourage and support planning of essential research on a world-wide basis.

The administration had expressed some misgivings about some details of the measure. Although the administration itself did not actively oppose the measure, Senate Republican leader Everett M. Dirksen (R., Ill.) led a fight against it. He told the Senate that it might unbalance the budget.

Senator Hill said the measure would help mobilize the world's best medical brains "against the killers that have baffled mankind through the centuries."

One objection by Arthur S. Flemming, Secretary of Health, Education, and Welfare, was that the $50,000,000 authorization might lead other nations to expect too much of the United States.

The American Medical Association has endorsed the measure. Dr. Gunnar Gundersen, A. M. A. President, in backing the legislation, suggested to the Senate committee that the program should be primarily one of research rather than construction of research facilities.

Although the measure did authorize grants for the improvement and construction of research facilities, the committee declared that the language is "not intended to authorize any large-scale brick and mortar program."

(Continued on next page)

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Lown, B., and Levine, S. A.: Current Concepts in Digitalis Therapy, Boston, Little, Brown & Company, 1954, p. 23, par. 2.

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The bill would place the research program under the U. S. surgeon general, provide a 19-member advisory council with control over financial grants, and authorize grants to the World Health Organization and other international groups for research and research training.

A specific prohibition against the supporting of operational public health or medical care programs was included.

WITNESSES BACK RADIATION HEALTH RESPONSIBILITY TRANSFER

Transfer of responsibility for radiation health protection from the Atomic Energy Commission to the Public Health Service was endorsed by most witnesses before a congressional committee, but as of this writing the administration still had not taken a position.

The issue is being considered by a Senate labor and public welfare subcommittee headed by Sen. Lister Hill (D., Ala.), who has introduced a measure to carry out the shift.

The legislation was prompted by the recent recommendation of the National Advisory Committee to the Public Health Service. Chairman of the civilian advisory group, Dr. Russell H. Morgan, professor of radiology at Johns Hopkins University, told the subcommittee that he considered it "unwise" for the same agency that handles promotion of nuclear energy uses to be responsible also for public safety aspects.

Dr. Richard H. Chamberlain, professor of radiology at the University of Pennsylvania and representing the American College of Radiology, supported the measure. But he said government regulation was only a partial answer and shouldn't interfere with the needed use of x-rays.

Bernard J. Conway of Chicago, speaking for the American Dental Association, advised a plan with "a minimum of federal control or sanctions."

The bill doesn't specify just how the PHS would carry out a supervisory program but merely directs the agency to study the question and recommend a detailed program by next February.

Dr. Berwyn F. Mattison, executive director of the American Public Health Association, proposed a "crash program" to assure adequate health protection "lest the rapidly expanding advances in nuclear energy far outstrip corresponding safeguards for the public."

Another witness, Dr. Herman E. Hilleboe, commissioner of health of New York state, said control over sources of radiation should be transferred to the states as soon as they could handle the job.

POLIOMYELITIS CASES RISE; VACCINATIONS URGED

The Public Health Service warned that almost twice as many cases of paralytic poliomyelitis have been reported during the first four months of 1959 as during the same period last year. The increase, coming on top of a 45% jump in incidence in 1958, points up the need for a renewed vaccination effort across the nation, PHS said.

A total of 283 cases has been reported so far in 1959, compared with 147 for the same period a year ago. Dr. John D. Porterfield, acting U. S. surgeon general, said, "We are at least two months away

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STUDY OF PATIENTS WITH HIP ARTHROPLASTY AT MASSACHUSETTS GENERAL HOSPITAL

Otto E. Aufranc, M.D.
and
Elliot B. Sweet, M.D., Boston

SINCE the conception by Smith-Petersen,[1] in 1925, of the principle of mold arthroplasty for treatment of diseases of the hip more than 1,500 mold arthroplasties have en performed at the Massachusetts General Hos- al, most of them since the evolution of the Vital- m mold in 1938. Believing that the surgical prin- ples and postoperative management of arthro- asty were well developed by 1945, we took our ses for study from among those patients operated since Jan. 1, 1946. An examination of the entire oup of patients was impractical because of their ographical distribution.

The late results of mold arthroplasty for disease of the hip were studied in 171 patients who were available for reexamination five or more years after the operation. Among these patients there were 201 mold arthroplasties to be reviewed, 81 (the largest group) for degenerative arthritis and 51 for congenital dislocation and subluxation. Ability to function and freedom from pain were assessed for each patient. Results were classified as excellent, good, or satisfactory in 164 hips (81.5% of operations among the 171 patients) and unsatisfactory in 37. The analysis showed that all the results classified as excellent were in patients in whom the disease had been unilateral and that bilateral disease was a severe handicap. Supplementary surgery was necessary in 12% of patients. These difficulties must be balanced against the excellent results frequently obtained with complete relief from pain in 27% and unlimited walking in 24% of patients.

Material

This study is a survey of Vitallium mold arthro- asties performed on Massachusetts residents in e Massachusetts General Hospital during the ears from 1946 to 1953. Ward service patients, s well as private patients of one of us (O.E.A.); e included. Patients with rheumatoid arthritis e not included because of the special problems aracteristic of this group. Arthroplasties were per- rmed on 246 hips in 213 patients. Of these 171 atients with 201 arthroplasties were examined. he original diagnoses in the series of 201 arthro-

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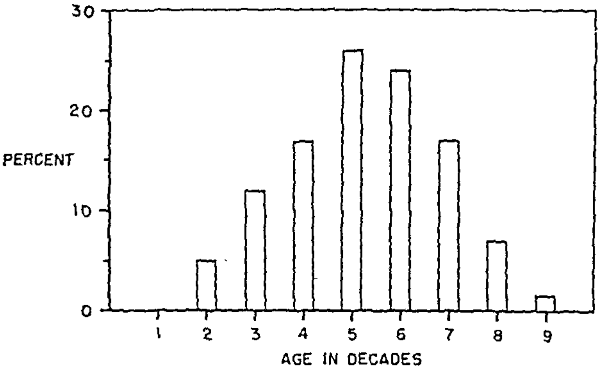
Chief of fracture clinic and visiting orthopedic surgeon, Massachusetts General Hospital (Dr. Aufranc), and physician, Hartford Hospit wington Hospital for Crippled Children (Dr. Sweet).
Read in part before the Boston Orthopedic Club, April 15, 1957.

plastic hips included degenerative arthritis (81), congenital dislocation and subluxation (51), old fractures of the femoral neck (23), septic arthritis and ankylosis (18), septic arthritis (14), traumatic dislocation and/or fractured acetabulum (9), old tuberculous arthritis (4), and chondroma of the acetabulum (1).

Of the 42 patients (14.5%) not included in this study 15 were dead. Eleven of these had been 63 or more years of age at the time of operation. One patient was a complete invalid due to advanced multiple sclerosis. Of the remaining 26 patients 6 were lost to follow-up, 16 were reached but failed to report for examination, and 4 have required supplementary surgery since Jan. 1, 1954. Complications in the original series of 246 arthroplasties included thrombophlebitis, 12 (5%); thrombophlebitis with pulmonary embolism, 9 (3.7%); miscellaneous, 8 (3%); subluxation, 4 (1.6%); wound sepsis, 3 (1.2%); death, 3 (1.2%); and dislocation, 1 (0.4%).



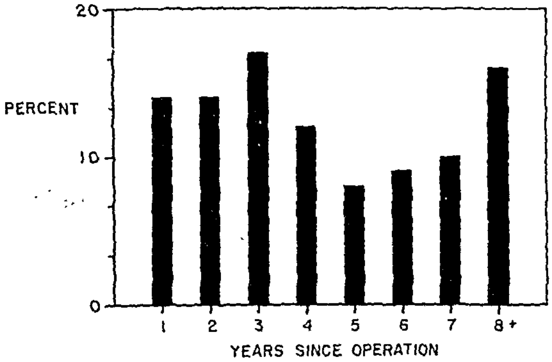


Fig. 1.—Distribution of patients by age at time of operation (*top*) and years since operation at time of study (*bottom*).

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Walking.—A scale for walking endurance, regardless of the amount of support needed, was used to indicate the development of endurance as follows: grade 1, walks as much as a normal person of the same age and sex; grade 2, walks up to one mile; grade 3, walks up to one-half mile; grade 4, walks only two to three city blocks; grade 5, walks only as necessary (from room to room); and grade 6, unable to walk, leads essentially a bed-and-chair existence.

Figure 3 shows the distribution of walking endurance. Most of these patients were able to walk at least one-half mile in a sustained walk, the poorest being those with unilateral arthroplasty in the presence of bilateral disease. These patients were generally held back by the hip without the arthroplasty. It was found that 18 of the 19 patients with unilateral disease who were at least eight years since operation could walk at least one-half mile, and 18 of the 23 patients with bilateral arthroplasties, at least five years since operation, could walk at least one-half mile. Twenty-four per cent of all patients had unlimited walking endurance.

Support.—The patients were asked to use enough support to keep them from limping and to protect them from muscle fatigue and pain. The use of adequate support allows the patient more comfortable physical activity than is possible without support. As muscle strength and endurance developed we allowed them to diminish the amount of support, but to return to more support if limp or symptoms occurred.[8] After a few months the patients understood this principle and were generally cooperative. Many patients learned to carry a cane long after they had developed a gait with a barely perceptible limp in case they should inadvertently "over-do." Thus, when we say in our charts "cane, part time," we mean that the patient will use the cane out of doors but is not dependent on it. We do not refer to the patient who uses the cane for support out of doors and the furniture indoors. These statements agree with those of Blount[7] and are made to explain the common use of support among our patients. The grading was on a four-point basis, as follows: grade 1, no support; grade 2, cane part time; grade 3, cane full time; and grade 4, crutches.

Of the patients with unilateral hip disease about three-quarters used little or no support. This was not true of patients with bilateral disease; only two patients with bilateral arthroplasties walked without some sort of support for one hip or the other, and most of them used a cane to support one hip. Patients with unilateral arthroplasty in the presence of bilateral disease were about as dependent on support in walking as were those with bilateral arthroplasty. Of the entire group 30% used no support, 34% used a cane part time, 21% used a cane full time, and 15% used crutches.

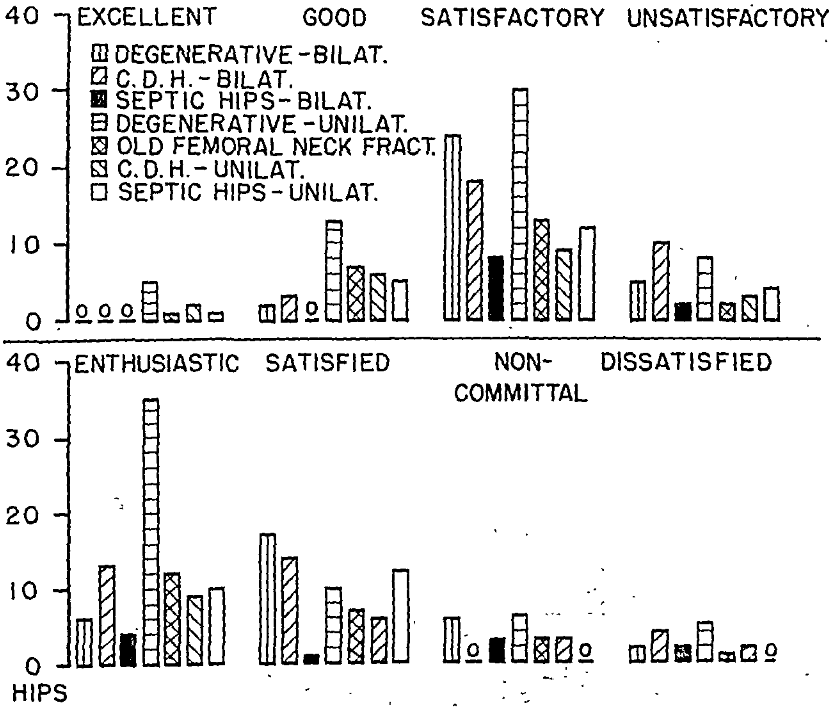

Fig. 2.—Distribution of patients by original diagnosis and two-way evaluation.

General Hip Function.—The following common hip functions were checked on each patient: ability to sit comfortably for one hour, ability to climb stairs foot after foot, ability to tie the shoe on the involved side, ability to squat, and ability to cross the involved leg over the opposite leg.

Only 12 patients out of the entire group were unable to sit comfortably for one hour. This was in contrast to more than two-thirds who had not been able to sit comfortably before operation.

The ability to go up stairs, one foot after the other, is a measure not only of the amount of flexion of the hip but also of its stability. Nearly two-thirds of the patients with mold arthroplasty were able to go up stairs one foot after the other, and about one-half were able to squat.

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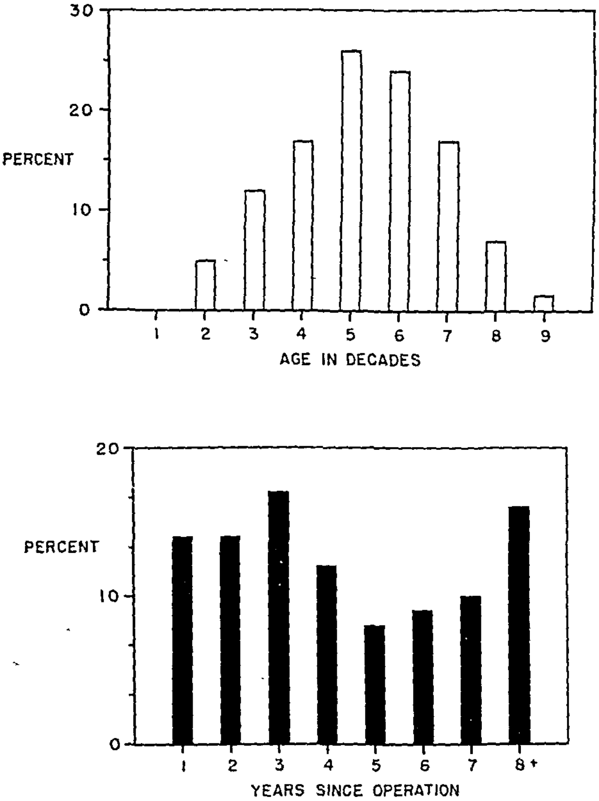

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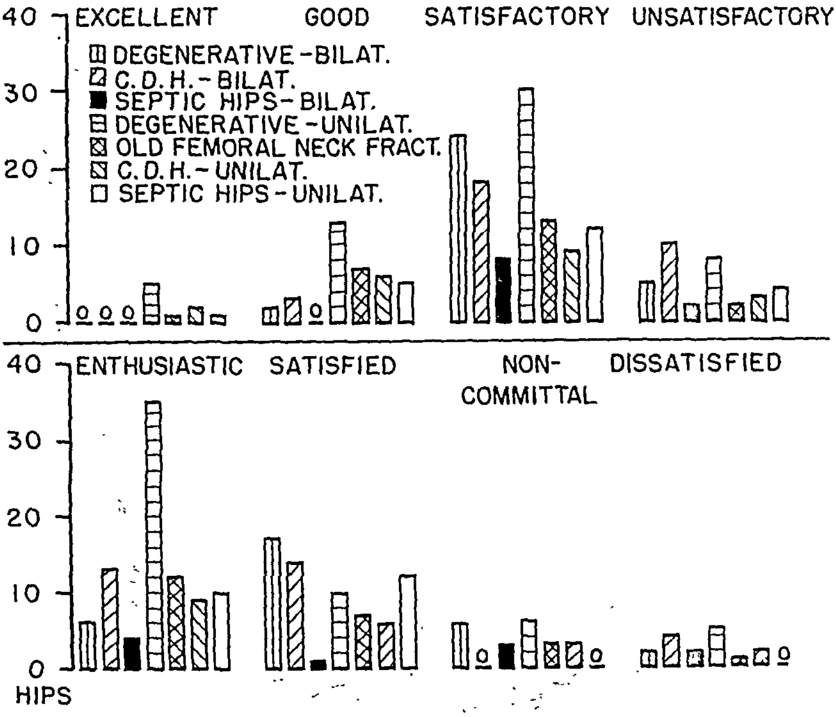

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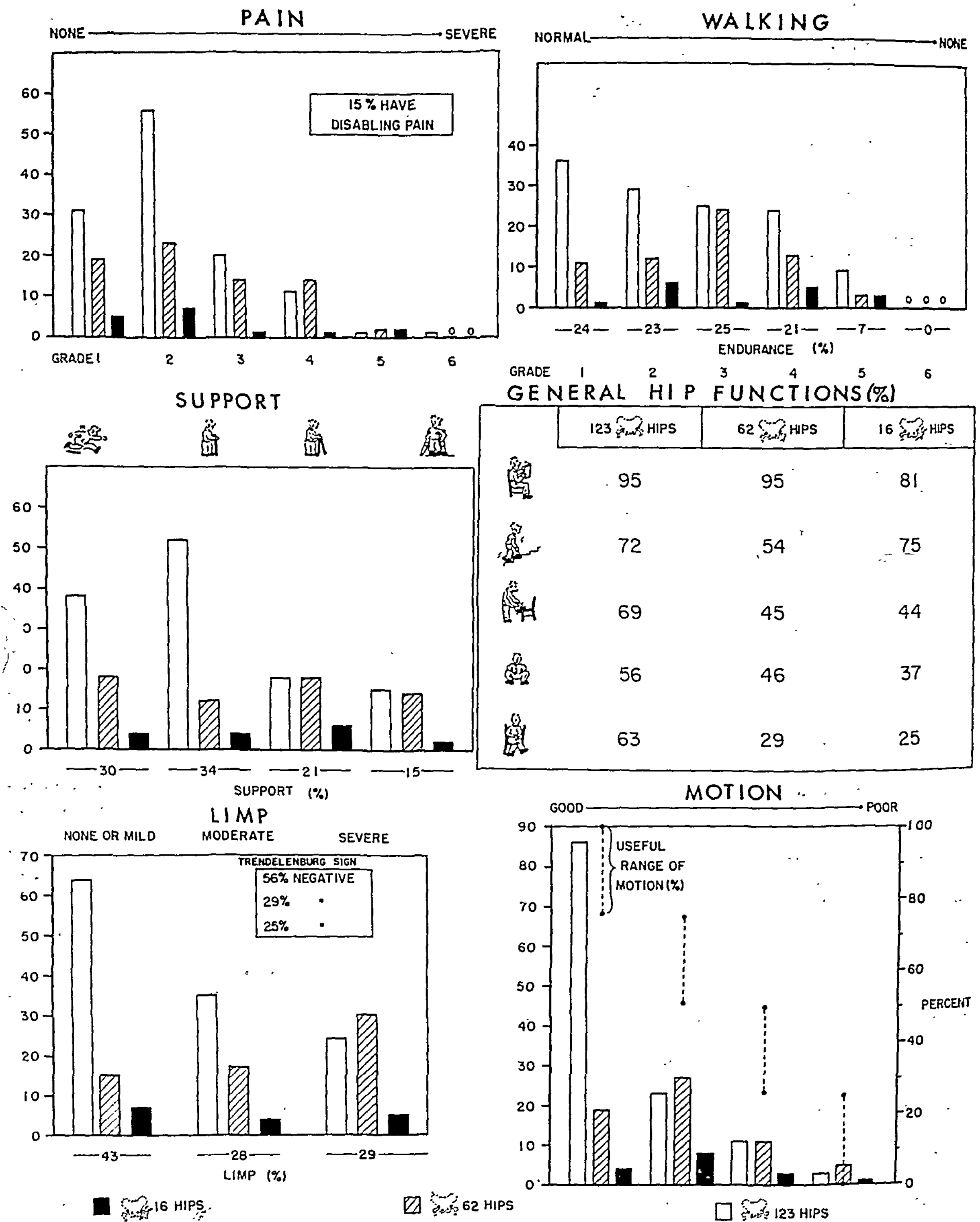


Fig. 3.—Distribution of patients with unilateral repair for unilateral disease (123), bilateral repair for bilateral disease (62), and unilateral repair but bilateral disease (16), by grade of pain, walking endurance, degree of support needed, general hip functions, degree of limp, and useful range of motion. Axis of ordinates: number of hips.

The ability to tie the shoe and to cross the involved leg over the other leg are measures of flexibility. More than one-half of the patients with unilateral hip disease were able to perform these functions, but those with bilateral disease fell short of one-half in the ability to tie the shoes, and only one-quarter could cross the involved leg over the opposite leg.

Limp.—The patients were observed walking with and without support. The limps were classified without support as none, slight, moderate, and severe. The classification refers only to the hip being studied.

Whereas limping was the rule in those patients with bilateral arthroplasty, about one-half of the patients with unilateral hip disease had little or no limp. The disappearance of the Trendelenburg sign is important to the eventual development of a graceful gait without an abductor lurch. It was frequently found that patients with a Trendelenburg-type gait had a negative result of the Trendelenburg test, and the limp could be corrected by simple gait training. Of the 32 patients with bilateral arthroplasties 4 were found to have bilateral absence of the Trendelenburg sign. More than one-half of the patients with unilateral hip disease had no Trendelenburg sign.

Useful Range of Motion.—The range of motion was measured according to the system of Cave and Roberts,[8] and a factor called the "useful range of motion" was determined. The useful range of motion is defined as the sum of motion between 0 degrees of fixed flexion and 90 degrees of further flexion, and between 20 degrees of adduction and 20 degrees of abduction. The useful range of motion is expressed in percentage of the normal useful range of motion, which is 130 degrees. This motion is measured passively and is kept within the above limits to penalize for fixed deformities. Rotation is not included in this arbitrary evaluation because rotation deformities, except for fixed internal rotation, rarely cause serious disability. Adduction deformities are considered to be very serious. The presence of an adduction deformity automatically puts the hip in the unsatisfactory classification. We have elected to use this method, believing that it yields useful information and is much simpler to use than that suggested by Ferguson and Howorth.[9]

We believe that the maintenance of a good passive range of motion is important, because we expect that, with the increased use of the hip under proper management, the muscles have a good chance to develop functional strength through this range. Figure 3 demonstrates that the arthroplastic hips in patients with unilateral disease had much freer motion than those in patients with bilateral disease. Only 10% of patients with unilateral hip disease had less than 50% useful range of motion. Most of those with poor motion in this group had followed an unsatisfactory postoperative program after discharge from the hospital.

Flexion deformity is not a major problem in patients with unilateral hip disease. Every step they take with the uninvolved hip tends to extend the involved hip. The patients were taught to stand with the hip in extension. It is much easier for patients with only one arthroplasty to care for the hip properly than it is for patients with two arthroplasties. Of the patients with a unilateral arthroplasty for unilateral disease only 17% had flexion deformity in excess of 15 degrees.

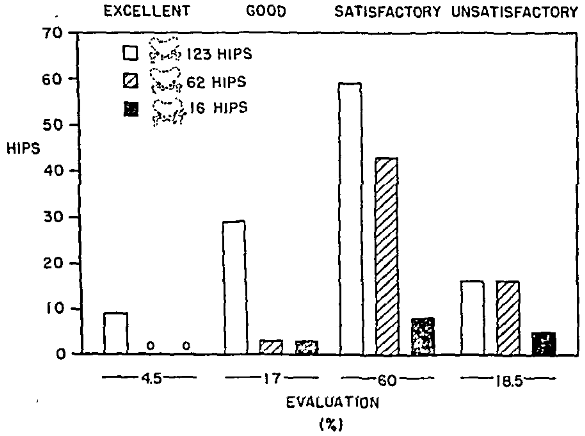
The problem is entirely different in the patients with bilateral hip disease, whether they have bilateral arthroplasty or not. Of these patients 60% were found to have flexion deformities in excess of 15 degrees, with 18% of the hips having more than 35 degrees of permanent flexion. It is believed that this deformity develops because, with weakness in both hips, the patients tend to sit more than they should, and when they stand and walk they prefer the tripod position, leaning forward on their crutches for more stability. It requires constant effort on the part of the patient to overcome these habits. A hip treated with arthroplasty is almost certain to assume the fixed flexion deformity of the opposite hip. In general, despite the high incidence of serious flexion deformities in the hips of patients with bilateral hip disease, these hips had good ranges of motion beyond their flexion deformities. The flexion deformity can be prevented by proper postoperative management.[10]

Only three patients in the entire group developed ankylosis in the involved hip. Of these, two were lost to follow-up examination early in the study and one had had ankylosis of the hip prior to operation as the result of septic arthritis as a child. This patient has had a second operation and is doing very well.

Clinical Evaluation and Patient Reaction

The clinical classification of renovated hips was as follows: Excellent: pain, grade 1 or 2 (little or no pain); walking, grade 1 (walks as far as a normal person of the same age and sex); support, none; limp, none or mild; hip functions, can sit comfortably for at least one hour, climb stairs foot after foot, and tie own shoe; useful range of motion, 75 to 100% without adduction deformity (98-130 degrees). Good: pain, grade 1 or 2 (little or no pain); walking, grade 1 or 2 (can walk at least one mile); support, no more than a cane part time; limp, moderate or better; hip functions, can sit comfortably for at least one hour, climb stairs foot after foot, and tie his own shoe; useful range of motion, 50 to 100% without adduction deformity (65-130 degrees). Satisfactory: pain, grade 4 if improved, or grade 3 or better (tolerable with limited activit improved or no more than mild when walking, disappearing with rest); walking, grade 4 if improved, or grade 3 or better (two to three city blocks if improved or at least one-half mile); support, may use cane or crutches; hip function, can *sit comfortably at least one hour; useful range of* motion, 25 to 100% without adduction deformity (33-130 degrees). Unsatisfactory: anything less than satisfactory.

It is obvious that any of the many factors used in this classification may change a given hip one or more categories. It is not enough for an arthroplasty to give good relief of pain; if this were the case results in more than 80% of the hips in this study would be called excellent. The goal is to establish as near normal function as is possible in each case. In our evaluation of these hips we used normal hip function as the standard as suggested by Hammond and co-workers.[2] This is a very strict measuring stick, but we feel it gives a more readily comprehensible assay of a large group of patients than can be obtained in the use of Judet's amelioration rate[4] or Shepherd's system.[11] In the final analysis, we are interested in how these patients function as compared to the general population. Figure [illegible] shows the comparative results of the three major groups of patients. Of the entire group 4.5% were excellent, 17% were good, 60% were satisfactory, and 18.5% unsatisfactory.



EVALUATION	CO-OPERATIVE (%)	UNCO-OPERATIVE (%)
EXCELLENT	5.5	2
GOOD	22.5	5
SATISFACTORY	56	68.5
UNSATISFACTORY	16	24.5
TOTAL —	144	57 HIPS

Fig. 4.—*Top*, distribution of patients by clinical results. *Bottom*, effect of patients' cooperation on clinical evaluations.

All of the "excellent" hips were found in those patients with unilateral arthroplasty for unilateral *disease, comprising 7.5% of that group. A great* majority of the "good" hips were also found in these patients. Most patients were eliminated from the "excellent" and "good" classifications by limitations of walking endurance and by inability to tie their shoes and climb stairs foot after foot. Obviously, the functional problems are compounded by the presence of disease in both hips, and only a few patients with bilateral arthroplasty could be expected to accomplish anything beyond "satisfactory" function. Most of the patients with hips classified as "satisfactory" far exceeded the minimum requirements for this classification in most components of the analysis. Of these 61% required no more support than a cane part time.

Of the 201 hips examined, 103 were in ward patients and 98 were in private patients. It was obvious from the beginning of the project that the private patients were much better controlled than the ward patients, although the follow-up examinations in both groups were directed by the same surgeons and the outline of management was the *same. As a group, the private patients seemed* to grasp the significance of the follow-up program better than the ward patients. There was a much lower rate of failure to meet follow-up appointments among the private patients. In general, the private patients had less pain, could walk farther, required less support, and had less limp, better stability and mobility, and a lower percentage of unsatisfactory hips. Of the ward patients 22% of the hips were unsatisfactory as compared with 14% of the hips of private patients.

Patient Reaction.—During the interview the patient's reaction to the arthroplasty was carefully reviewed and his reaction classified by the examiner as enthusiastic, satisfied, noncommittal, or dissatisfied. Patient reaction data are summarized in figure 5.

The patient reaction was more favorable than the clinical evaluation (fig. 5, *bottom*). A large percentage of patients with unsatisfactory clinical results were quite pleased with the result, usually because of relief of pain. With a few exceptions, the more pain and disability the patient had before operation the more satisfied he was with the result.

Special Groups

Clinically Satisfactory Results.—There were 120 hips which were classified as satisfactory, excluding the excellent and good hips. Of these 120 hips 90 caused little or no pain, 23 caused pain which was mild when walking and disappeared with rest, and 7 caused pain which was tolerable with limited activity. Twenty-two allowed unlimited walking, 26 allowed walking at least one mile, 41 allowed walking at least one-half mile, 24 allowed walking only two or three city blocks, and in seven patients walking was limited to from one room to another. The last seven hips are included in the satisfactory group because conditions other than the hips were the limiting factors. Twenty-seven of the hips required no support, 46 required a cane part time, 30 a cane full time, and 17 required the use of crutches. Forty-seven of the hips did not exhibit Trendelenburg's sign.

Clinically Unsatisfactory Results.—There were 37 hips classified as unsatisfactory. Of these hips 10 caused little or no pain, 6 caused mild pain when walking which disappeared with rest, 15 caused pain which was tolerable with limited activity, 5 caused pain which was severe with walking and limited activity markedly, and 1 caused severe pain at all times, interfering with sleep. Three of these hips allowed unlimited walking, 3 allowed walking to at least one mile, 7 allowed walking up to one-half mile, 15 allowed walking only two or three city blocks, and 9 allowed walking only from one room to another. Four of these hips required no support, 7 required a cane part time, 12 a cane full time, and 14 required crutches. Of the patients with unsatisfactory results 23 were satisfied or enthusiastic and 14 were either noncommittal or dissatisfied.

Shaft Arthroplasty.—The shaft arthroplasty is performed when there is not sufficient head or neck available for the usual positioning of the mold. In this procedure the proximal end of the femoral shaft is prepared by removing the greater and lesser trochanters and placing the mold on the end of the shaft which is then placed in the new acetabulum. The greater trochanter, with the insertions of the hip abductors, is then transplanted down the lateral aspect of the femoral shaft and the iliopsoas tendon to the anterior aspect of the femoral shaft to reestablish the functional length of these muscles. This procedure results in shortening of the femur. Although the shaft arthroplasty yields a weak hip, its function is remarkably good.[10a] Until good femoral head and neck prostheses were developed, this was almost standard treatment at the Massachusetts General Hospital for nonunion and aseptic necrosis after femoral neck fractures. The prosthesis has now taken its place as the preferred treatment in these conditions. Occasionally a hip reconstruction with the use of a prosthesis becomes complicated by sepsis or by disintegration of the proximal end of the femur, but catastrophe can be converted into a satisfactory result by the use of a shaft arthroplasty with a mold.

Of the 21 patients with unilateral hip disease treated with shaft arthroplasty 17 had little or no pain, six were unlimited in their walking, 5 could walk at least one mile, 3 could walk at least one-half mile, 5 could walk only two to three city blocks, and 2 were able to walk only from one room to another. The two patients who could walk only from one room to another were elderly persons who otherwise probably would have been bedridden. Of these patients 10 required no support in walking, 5 used a cane part time, 5 used a cane full time, and 1 was entirely dependent on crutches. Twelve of the patients had no Trendelenburg sign. Although none of the hips could be classified as excellent, 10 were classified as good, 10 as satisfactory, and only 1 as unsatisfactory.

	☀	☀	⛅	⛈
123 HIPS	67	34	7	15
62 HIPS	20	30	2	10
16 HIPS	6	7	3	0
REACTION (%)	51	35	6	8

CLINICAL EVALUATION	NO. OF HIPS	PATIENT REACTION			
		ENTHUSIASTIC	SATISFIED	NON-COMMITTAL	DISSATISFIED
EXCELLENT	9	ALL	—	—	—
GOOD	35	66	31	—	3
SATISFACTORY	120	46	37	12	5
UNSATISFACTORY	37	16	47	16	21

Fig. 5.—*Top*, distribution of patients by reaction to clinical results. *Bottom*, relation of reaction to clinical evaluation.

Hips Ankylosed by Septic Arthritis.—There were eight patients in the group examined who had an arthroplasty performed for septic arthritis of one hip, resulting in ankylosis in poor position. Of these patients four had little or no pain, three had pain which was mild when walking and disappeared with rest, and one had pain which was tolerable with limited activity. One of the patients was unlimited in walking, three were able to walk at least one mile, two were able to walk at least one-half mile, and one was able to walk only two or three city blocks. One patient required no support in walking, three required a cane part time, three required a cane full time, and one required crutches. Four of the eight patients had no Trendelenburg sign. One of these hips was classified as excellent, six as satisfactory, and one as unsatisfactory. All of the patients were either satisfied or enthusiastic about the results of surgery.

Three of the four patients who exhibited no Trendelenburg sign were in their teens and one was 5 years old at the time of the original ankylosis. The average time between ankylosis and arthroplasty was 24.5 years for the group as a whole and 15.75 years for those with no Trendelenburg sign. All of the patients with a Trendelenburg sign developed ankylosis before the age of 10 years.

Supplementary Surgery.—Of the 237 hips in 194 patients who underwent their first arthroplastic procedure at the Massachusetts General Hospital during the period being studied, 23 have required major supplementary surgery consisting of at least capsulectomy and acetabuloplasty. This group is broken down to 15 (9%) of 169 patients with unilateral arthroplasty; 8 (24%) of 33 patients with bilateral arthroplasty; 15 (15%) of 99 ward patients; and 8 (8.5%) of 95 private patients; for a total of 23 (12%) of 194 patients.

The indications for supplementary surgery were persistent pain, loss of motion, instability, and persistent sepsis. Supplementary operations were performed for pain and/or limitation of motion in 73% of the hips, for subluxation or dislocation in 15%, and for persistent sepsis in 12%. None of the revised hips was rated as excellent, 19% were rated as good, 58% were rated as satisfactory, and 23% were rated as unsatisfactory. This represents a salvage rate of 77%.

Comment

The study of a group of surgical patients by a surgeon who had no hand in the surgery will usually remain unbiased. A cold clinical study cannot tell the whole story. Many other factors enter into the total picture; such things as enthusiasm or indifference, other demands on the patient's time, and his individual characteristics and physical ability all contribute to the end-result. These same things apply to the doctor and his relationship with his patient. This logically sets up a two-way evaluation of the result: the patient's and the surgeon's evaluation. The over-all results of these two systems were the same, although the finer points of the clinical evaluation were more severe. The patients were more generally pleased than the surgeon. This is as it should be. It will keep us working for better results and at the same time build up our confidence by patients' approval.

The factual data in this study have a major weakness in that they cannot reveal the reasons why we have altered a surgical technique and/or the aftercare of these patients. Yet both of these factors, we believe, have made major differences in the total end-result.[12]

Physiological healing of bone, tendon, and muscle must take place before heavy functional use should be expected or tried. This process will take many months in atrophied bone and weak muscle. It is a gradual process, and any attempt to force or hurry the progress of improvement will often be disastrous.

A gradual, gentle program which includes regular exercise and regular rest is essential. Supportive weight-bearing with both crutches is mandatory until there is clinical and roentgenologic evidence of bone healing. The gradual loss of sensitivity in and about the hip with roentgenologic evidence of increasing homogeneous density is a guide to increasing activity. The management of the reconstructed hip joint follows closely that of a fracture of the femur with a little more concern about weight-bearing and a little more time for dense healing. This is necessary because the weight falls on a small surface and the levered forces act on these surfaces.

Summary and Conclusions

The following conclusions can be drawn from our study: 1. The surgical hazards of mold arthroplasty are not great. 2. Relief of disabling pain may be expected in 85% of patients, with complete relief of pain in 27%. 3. Unlimited walking may be expected in 24%, walking without support in 30%, with a cane part or full time in 55%, and with crutches in 15%. 4. A wide useful range of motion may be expected in patients with unilateral disease, and a limited useful range of motion may be expected in those with bilateral disease. 5. A satisfactory or better result may be expected in 81.5% of patients, good to excellent result in 28% of those who are able to follow the postoperative program, and good to excellent results in 7% who are unable to follow the postoperative program. The group of patients unable to follow the postoperative program may expect a one-third greater chance of obtaining an unsatisfactory result. 6. There is no constant correlation between the clinical evaluation of the result of surgery and the patients' own evaluation. 7. Supplementary surgery may be required in 12% of patients, with an expected salvage rate of 77%.

266 Beacon St. (Dr. Aufranc).

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STUDY OF SURGICALLY EXCISED PULMONARY GRANULOMAS

Edward L. Segal, M.D., Grier F. Starr, M.D.
and
Lyle A. Weed, M.D., Rochester, Minn.

The cause of the majority of surgically excised pulmonary granulomas has not been determined, even with extensive bacteriological studies. However, through application of Gomori's methenamine-silver nitrate stain (GMS) to 138 such surgically excised lesions over a two-and-a-half-year period, it was possible to identify "structures" resembling Histoplasma capsulatum or Coccidioides immitis in 55.9%. Despite extensive efforts, it was not possible to obtain fungus growths from these structures, which are thought to be nonviable fungi that have lost their ordinary stainability. With the GMS stain, fungi can be found in tissue sections more rapidly and under lower magnification than by other staining methods.

The cause of the majority of surgically excised pulmonary granulomas has not been determined, even with extensive bacteriological studies. In 1951, Good and associates[1] found it possible to identify a causative agent in only 21 of 65 surgically excised pulmonary granulomas with use of standard bacteriological and histological methods. In general, granulomas are excised from the lung because a diagnosis of pulmonary malignant tumor cannot be excluded; approximately one-third of solitary masses excised from the lungs are granulomas.[2] For the past two and one-half years, Gomori's methenamine–silver nitrate stain[3] (GMS) has been applied at the Mayo Clinic to these surgically excised pulmonary granulomas in addition to the routine bacteriological and histological methods; this study was undertaken in an attempt to evaluate the results obtained with the GMS stain as an aid in determining the cause of these granulomas.

Methods and Materials

Methods.—Since September, 1946, all surgically excised pulmonary granulomas have been examined at the clinic by the following procedure: If the surgeon suspects that the pulmonary mass he is resecting is a granuloma, he bisects the specimen and, utilizing aseptic techniques, places half of the specimen in a sterile container for bacteriological studies and sends the other half to the surgical pathology laboratory for identification by examination of fresh frozen sections (with use of Terry's modified polychrome methylene blue).

If the surgical specimen contains a granuloma, the half in the sterile container is ground aseptically in a mortar and pestle with 60-mesh aluminum oxide (alundum), and a 20% suspension is made in broth. This suspension is then inoculated by the massive-inoculation technique, that is, a few drops of the suspension are placed on the medium and distrib-

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From the sections of surgical pathology (Dr. Starr) and bacteriology (Dr. Weed), Mayo Clinic and Mayo Foundation. Dr. Segal is a fellow in pathology at the Mayo Foundation, which is a part of the Graduate School of the University of Minnesota.

uted with a glass rod; these mediums are used: hormone blood agar[4] at 37 C, 30 C, and, in 10% carbon dioxide solution, 37 C (all in duplicate); chocolate agar in 10% carbon dioxide solution at 37 C; thioglycollate broth or brain broth at 37 C; Lowenstein-Jensen medium at 37 C (in duplicate); Petragnani's medium at 37 C (in duplicate); and subcutaneous and intraperitoneal inoculation into two guinea pigs.

The organisms most frequently encountered as the causative agents of pulmonary granulomas are the pathogenic deep fungi, Mycobacterium tuberculosis, Brucella, Nocardia, Actinomyces, and Hemophilus influenzae. Routine cultures are observed for three weeks, cultures for Myco. tuberculosis for a maximum of eight weeks, and inoculated guinea pigs for eight weeks. Depending on the results of these cultures and animal inoculations, special stains are used and appropriate subcultures made.

Table 1.—*Etiological Factors in 138 Surgically Excised Pulmonary Granulomas as Shown by Culture or Special Stains or Both*

	Type of Granuloma							
	Tuberculoma-like		Infiltrative		Excavating		Total	
Group	No.	%	No.	%	No.	%	No.	%
A—Positive culture	5	5.5	15	51.9	13	76.5	33	23.8
Mycobacterium tuberculosis	2	2.2	6	20.9	11	64.7	19	13.8
Coccidioides immitis	2	2.2	3	10.4	..	..	5	3.6
Cryptococcus neoformans	..	..	3	10.4	..	..	3	2.2
Saprophytic acid-fast bacilli	..	..	..	..	2	11.8	2	1.4
Brucella suis	1	1.1	..	..	..	..	1	0.7
Histoplasma capsulatum	..	..	1	3.4	..	..	1	0.7
Blastomyces dermatitidis	..	..	1	3.4	..	..	1	0.7
Aspergillus	..	..	1	3.4	..	..	1	0.7
B—Negative culture and positive histopathology	75	81.5	4	13.6	0	0.0	79	57.3
Structures resembling H. capsulatum	67	72.8	1	3.4	..	..	68	49.4
Structures resembling C. immitis	7	7.6	..	..	..	..	7	5.1
Acid-fast bacilli	1	1.1	1	3.4	..	..	2	1.4
Lipid granuloma	..	..	1	3.4	..	..	1	0.7
Eosinophilic granuloma	..	..	1	3.4	..	..	1	0.7
C—Negative culture and negative histopathology	12	13.0	10	34.5	4	23.5	26	18.9
Total	92	100.0	29	100.0	17	100.0	138	100.0

The other half of the granuloma, which had been utilized for the frozen section, is embedded in paraffin, sectioned, and stained as follows: routine stain, hematoxylin and eosin; acid-fast bacilli, night-blue stain[5] counterstained with safranine; and fungi, periodic acid–Schiff stain (PAS) used from 1952 to 1955 and GMS[3] from 1956 to the present. These slides are available by noon of the following day; if "structures" resembling organisms are seen histologically, the bacteriology laboratory is notified so that appropriate extra mediums may be inoculated if necessary.

Materials.—From September, 1946, through June, 1958, a total of 603 surgically resected pulmonary granulomas have been studied by means of the routine procedure outlined above. None of the 465 granulomas excised before 1956 were stained by the GMS technique. There were 138 granulomas excised during the two-and-one-half-year period from January, 1956, through June, 1958; all these granulomas were stained by the GMS technique.

Mainly on the basis of gross appearance, pulmonary granulomas can be classified into one of three main morphologic types: (1) tuberculoma-like—discrete, solitary, well-circumscribed, nodular, caseous, nonexcavating, granulomatous lesions; (2) infiltrative—diffuse lesions with multiple foci of caseous and noncaseous, nonexcavating, granulomatous reactions; and (3) excavating—excavating caseous lesions with granulomatous reactions. Of the 138 granulomas stained by the GMS technique, 92 were of the tuberculoma-like type, 29 were of the infiltrative type, and 17 were of the excavating type.

For purposes of discussion, the 138 GMS-stained pulmonary granulomas were placed into three groups based on the bacteriological and histological findings in each granuloma. Group A, positive culture, included those granulomas in which the causative organisms were isolated by culture. Group B, negative culture and positive histopathology, included those granulomas in which "structures" resembling organisms were found by histological methods but all attempts to culture these structures were unsuccessful; also included in this group were lipoid granulomas and eosinophilic granulomas. Group C, negative culture and negative histopathology, included those granulomas which were culturally sterile and in which no structures resembling organisms were observed histologically.

Observations

The results of study of the 138 GMS-stained pulmonary granulomas are summarized in table 1. Results of culture in approximately one-fourth (23.8%) of the granulomas were positive (group A). More than half (55.9%) of the granulomas were found to contain structures that resembled organisms on microscopic examination of the GMS-stained sections; all attempts to culture these structures were unsuccessful (group B). Approximately one-fifth

(18.9%) of the granulomas were culturally sterile and contained no structures resembling organisms on histological examination (group C).

Of the 92 tuberculoma-like pulmonary granulomas, only 5 gave positive results on culture (group A), while 80.4% of the granulomas contained microscopic structures resembling organisms that could not be grown on culture mediums (group B). These structures, observed in the GMS-stained sections, resembled Histoplasma capsulatum (fig. 1*a* and *b*) in 72.8% and Coccidioides immitis (fig. 2) in 7.6% of these tuberculoma-like granulomas. These structures resembling organisms were found scattered in the central caseous debris of the pulmonary granulomas. With the PAS stain (fig. 1*c*), these structures appeared to be distorted forms of H. capsulatum; many of them had lost their central, purplish-red mass. In one granuloma in group B, acid-fast bacilli were observed in the section stained by the night-blue technique but all cultures of this lesion gave negative results. Also included in this group were one lipoid granuloma and one eosinophilic granuloma. Only 13% of the tuberculoma-like pulmonary granulomas gave negative cultural and histological results (group C).

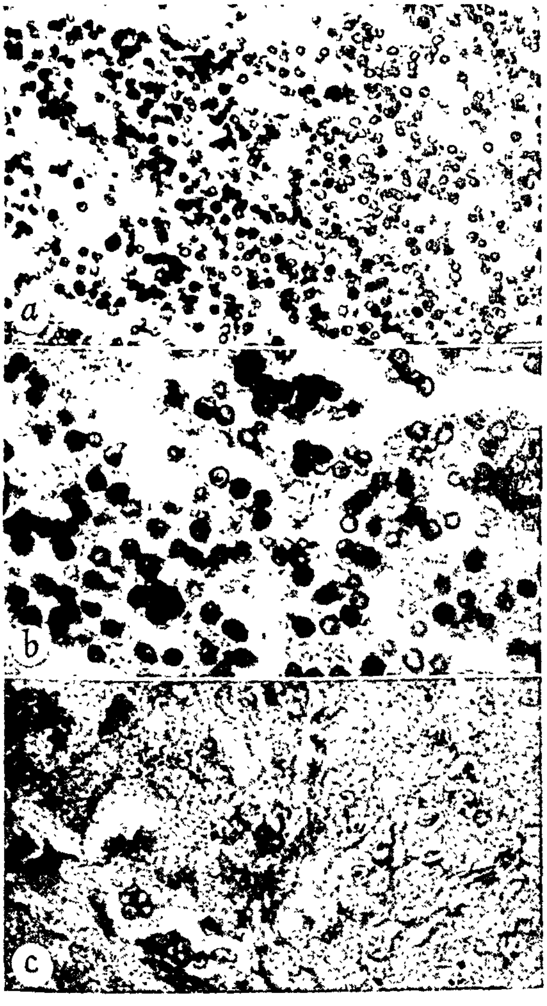

Fig. 1.—Structures histologically resembling H. capsulatum in culturally sterile pulmonary granuloma. *a*, GMS, ×480; *b*, GMS, ×970; *c*, PAS, ×970.

Of the 29 infiltrative pulmonary granulomas, more than half (51.9%) gave culturally positive results (group A). Only one pulmonary granuloma of the infiltrative type contained structures histologically resembling H. capsulatum in the GMS-stained section and gave negative results on culture (group B). Sputum culture from the patient from whom this pulmonary granuloma was excised had given positive results for H. capsulatum approximately nine months prior to excision of the pulmonary lesion. After one month of rest in bed, his sputum no longer had shown evidence of H. capsulatum. Five months before operation, he had been treated for 10 weeks with amphotericin B. The lesion removed at operation was diffuse and was classified as an infiltrative pulmonary granuloma.

Of the 17 excavating pulmonary granulomas, more than three-fourths (76.5%) gave culturally positive results (group A). Fungi were not seen in any of the GMS-stained sections of these granulomas.

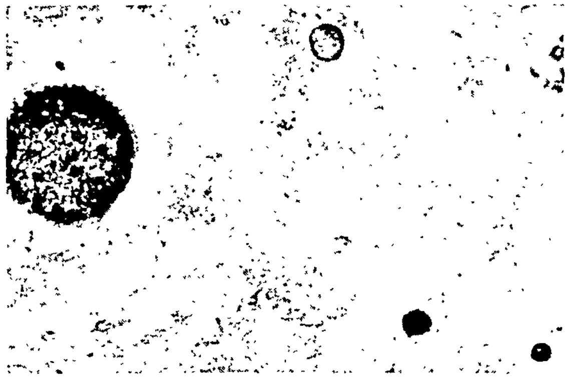

Fig. 2.—Structures histologically resembling C. immitis in a culturally sterile pulmonary granuloma. Endosporulating spherule on left, developing spores on right (GMS, ×970).

Only 1 of the 69 granulomas that contained structures resembling H. capsulatum on GMS-stained sections gave positive results on culture. This lesion is illustrated in figure 3. The structures in this lesion were present in intact macrophages instead of being scattered in the caseous debris. C. immitis was isolated by bacteriological methods from 5 of the 12 lesions that contained structures resembling this fungus.

Data comparing the pulmonary granulomas excised before use of the GMS technique with those excised subsequently are summarized in table 2. The percentage of granulomas in the positive culture group (group A) decreased from 36.8 to 23.8. The percentage of granulomas with negative culture and positive histopathology (group B) increased approximately 10 times (5.8 to 57.3%). In only one culturally sterile granuloma in the group in which the GMS stain was not applied were structures found that histologically resembled H. capsulatum, and in only one culturally sterile granuloma in this same group were structures found that histologically resembled C. immitis; the structures in both of these granulomas were found in sections stained by the PAS technique. The percentage of granulomas with negative culture and negative histopathology (group C) decreased approximately threefold (57.4 to 18.9%).

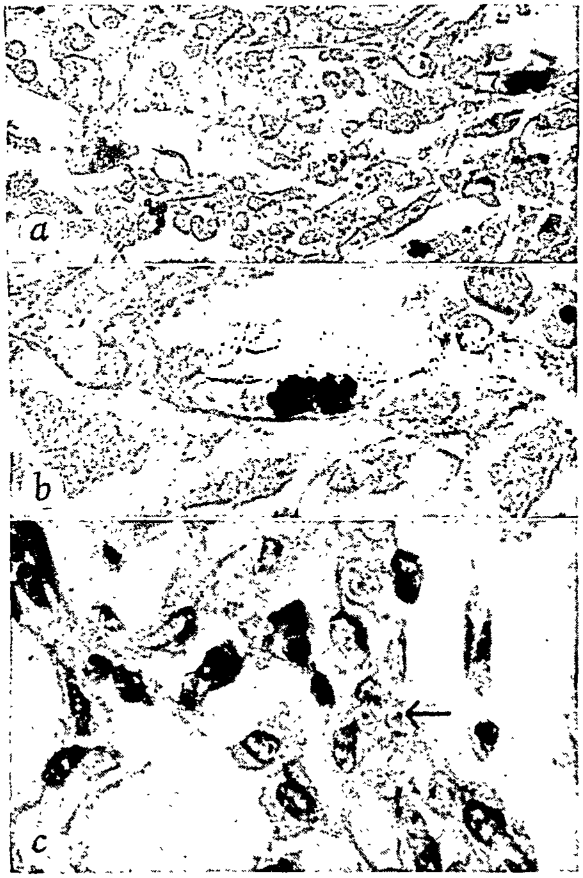

Fig. 3.—Structures histologically resembling H. capsulatum in a pulmonary granuloma culturally positive for H. capsulatum. *a*, GMS, ×480; *b*, GMS, ×970; *c*, PAS, ×970.

Clinical Data and Pathology

Clinical Data.—As already noted, 68 of this series of 138 patients had pulmonary granulomas that were culturally sterile but in which GMS-stained sections showed structures morphologically resembling H. capsulatum. Table 3 lists the resident states and countries of these 68 patients and compares the percentage of them residing in these states and countries with the percentage of all Mayo Clinic patients residing in these same states or countries. Figure 4 indicates the geographical distribution of cutaneous sensitivity to histoplasmin (percentage of positive reactors) in the United States, based on the analysis of Furcolow,[6] as well as the percentage of the 68 patients residing in each state.

Approximately 45% of these patients came to the clinic specifically for evaluation of a solitary nodule or "coin" lesion that had been found on a thoracic roentgenogram taken either as part of a routine physical examination or during a survey by a mobile unit; in the remaining 55% of the patients, the pulmonary lesion was first discovered in the thoracic roentgenogram taken as part of the routine examination at the clinic. These patients had no pulmonary symptoms or physical signs that could be related to an infectious process at the time of their examinations. Approximately 90% of the patients could not recall any definite episodes in their histories when they might have been infected with H. capsulatum; about 10% of the patients did recall an episode of malaise and fever lasting from 1 to 10 days that was sometimes accompanied by cough or thoracic pain. In general, these episodes had been diagnosed as an infection of the upper part of the respiratory tract, influenza, or atypical pneumonia. The thoracic roentgenograms were described as showing a solitary, nodular, sharply circumscribed lesion varying from 1 to 3 cm. in diameter. *Calcium* was recognized in these routine roentgenograms in only 2 of the 68 cases. Tomography was performed in 54 of the 68 cases; calcification was found in five lesions, and questionable calcification was found in four additional lesions. The results of intracutaneous

Table 2.—*Diagnostic Grouping of 603 Surgically Excised Pulmonary Granulomas*

	GMS Stain			
	Not Applied (9/1/46 to 12/31/55)		Applied (1/1/56 to 6/30/58)	
Group	No.	%	No.	%
A—Positive culture	171	36.8	33	23.8
B—Negative culture and positive histopathology	27	5.8	79	57.3
C—Negative culture and negative histopathology	267	57.4	26	18.9
Total	465	100.0	138	100.0

Table 3.—*Residence of Sixty-eight Patients with Culturally Sterile Pulmonary Granulomas Containing "Structures" Resembling Histoplasma capsulatum as Compared to That of All Mayo Clinic Patients*

	Patients with Granulomas		All Mayo Clinic Patients, %
Residence	No.	%	
Illinois	21	30.8	9.7
Iowa	12	17.6	10.0
Wisconsin	11	16.2	6.5
Minnesota	10	14.7	37.9
Indiana	3	4.4	3.9
Missouri	2	2.9	2.0
Nebraska	2	2.9	2.5
Michigan	1	1.5	2.5
Kentucky	1	1.5	0.4
Arkansas	1	1.5	1.1
Oklahoma	1	1.5	1.3
Texas	1	1.5	1.3
Montana	1	1.5	1.6
Canada	1	1.5	4.0
Other states and countries	0	0	15.3
Total	68	100.0	100.0

tests with histoplasmin, tuberculin, coccidioidin, and blastomycin are summarized in tables 4 and 5. In only 24 of the 68 cases had the histoplasmin skin test been applied; the results were positive in 22 of the cases and negative in 2.

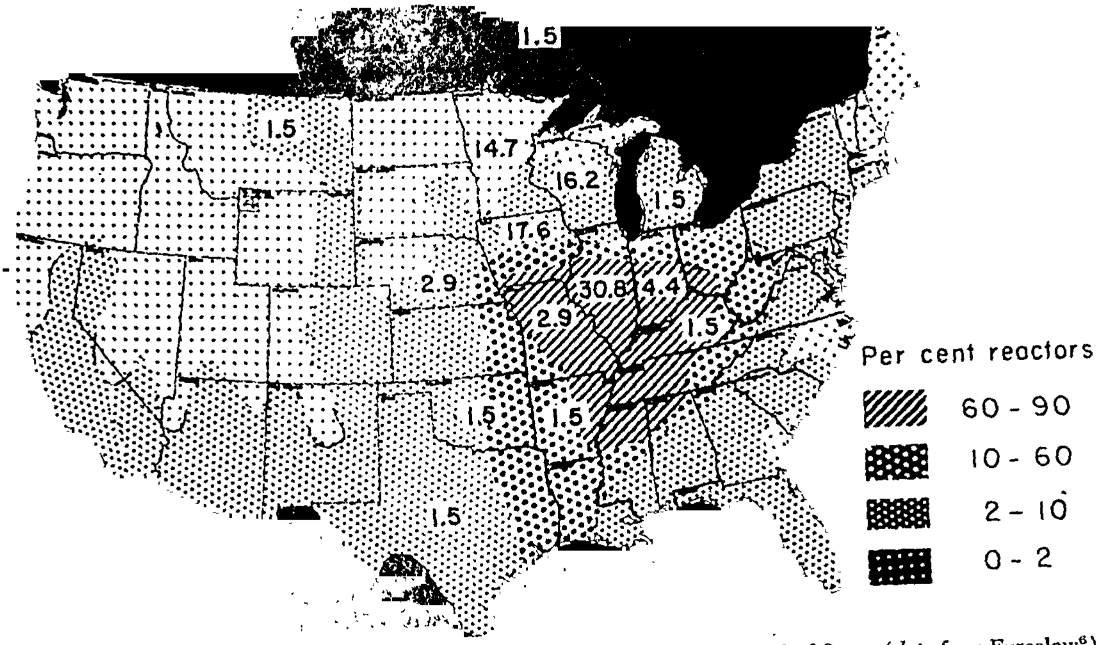

Fig. 4.—Geographic distribution of cutaneous sensitivity to histoplasmin in United States (data from Furcolow[6]). Numbers indicate percentages from each state of our 68 patients with culturally sterile pulmonary granulomas containing structures resembling H. capsulatum.

Seven of the 138 patients had pulmonary granulomas that gave negative results on culture but in which the GMS-stained sections showed organisms morphologically resembling C. immitis. Six of these patients had resided or traveled in California, and the seventh patient's residence was in Arizona. The chief complaint of three of these patients was a solitary pulmonary nodule that had been found on a thoracic roentgenogram taken in their home town; in the other four patients, the lesion was first discovered in the thoracic roentgenogram taken as part of the routine examination at the clinic. These patients did not have any pulmonary symptoms or physical signs that could be related to an infectious process at the time of their examinations. Five of the patients had been asymptomatic. In 1952, one patient had been treated with streptomycin for "desert fever." In 1955, another patient had been hospitalized in a sanatorium with chills, fever, and thoracic pain but was released when tuberculosis had been excluded. The lesions observed in the thoracic roentgenograms in these seven patients were similar to those seen in the 68 patients discussed in the preceding paragraph. Calcification was not observed in the routine roentgenograms, and tomography, performed in four of the seven cases, also failed to reveal any calcification. In two of the patients, three intracutaneous tests (coccidioidin, histoplasmin, and tuberculin) had been utilized and all three gave positive results. In an additional two patients, only the tuberculin skin test had been used; it gave positive results in one patient and negative results in the other. Intracutaneous tests were not given to the remaining three patients.

Table 4.—*Results of Skin Tests in Sixty-eight Patients with Culturally Sterile Pulmonary Granulomas Containing Structures Resembling Histoplasma Capsulatum*

	Skin Tests			
Results	Histoplasmin	Tuberculin	Coccidioidin	Blastomycin
Positive, no.	22	20	0	0
Negative, no.	2	17	10	2
Total	24	37	10	2

Table 5.—*Histoplasmin and Tuberculin Skin Reactions in Sixty-eight Patients with Culturally Sterile Pulmonary Granulomas Containing Structures Resembling Histoplasma Capsulatum*

	Histoplasmin		
Tuberculin	Positive	Negative	Not Performed
Positive, no.	10	2	8
Negative, no.	10	0	7
Not performed, no.	2	0	29

Pathology.—The culturally sterile pulmonary lesions observed in the 68 granulomas containing structures histologically resembling H. capsulatum and in the seven granulomas containing structures histologically resembling C. immitis were identical on gross and microscopic examination except for the presence of the different structures observed in the

GMS-stained sections. In addition, these lesions could not be differentiated from the "tuberculomas" observed in infections with Myco. tuberculosis other than by identifying the offending organisms (fig. 5). The lesions were solitary, circumscribed, and grayish-white, and they varied from 1 to 3 cm. in diameter, with a central caseous zone (sometimes containing flecks of calcium) and peripheral concentric laminations. The consistency varied from semifluctuant to hard and rubbery. These 75 lesions were all grossly and microscopically identical and were characteristic of tuberculoma-like granulomas, with the exception of the one lesion that was of the infiltrative type.

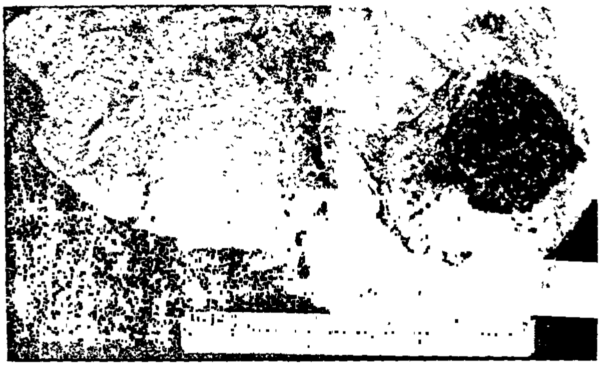

Fig. 5.—Typical gross appearance of surgically resected pulmonary granulomas. *Left*, culturally sterile lesion containing structures histologically resembling H. capsulatum. *Right*, lesion containing acid-fast bacilli and culturally positive for Myco. tuberculosis.

Additional Studies

In a further attempt to evaluate the effectiveness of the GMS stain for demonstrating fungi in tissue, sections of selected granulomas excised prior to January, 1956, were stained by the GMS technique. Application of this stain to the 65 granulomas studied by Good and associates [1] revealed the presence of structures resembling H. capsulatum in 20 of the 44 previously indeterminate lesions and structures resembling C. immitis in two of the previously indeterminate lesions. Thus, with the GMS stain, structures resembling organisms were found in 50% of the previously indeterminate, culturally sterile pulmonary granulomas.

In 1954, Starr and co-workers [7] carried out two series of studies in an attempt to evaluate the effectiveness of the PAS stain for demonstrating fungi in tissue. The first series consisted of 50 culturally sterile pulmonary granulomas excised from 1946 through 1953; 22 of these lesions were tuberculoma-like, 21 were infiltrating in type, and seven were of the excavating type. No organisms were found by routine staining with hematoxylin and eosin. The PAS stain revealed the presence of structures histologically resembling H. capsulatum in only 1 of these 50 granulomas, and this lesion was tuberculoma-like. In many of the PAS-stained sections of the granulomas, Starr and associates [7] observed fine red rings surrounding a clear zone without any central purplish-red mass but they would not make a diagnosis of structures resembling H. capsulatum unless such a mass was present. As part of the present study, application of the GMS stain revealed the presence of structures resembling organisms in 16 of these 50 granulomas; these structures were found only in the tuberculoma-like granulomas. In 15 of the granulomas, structures histologically resembling H. capsulatum were observed; structures histologically resembling C. immitis were noted in one granuloma.

The second series studied during the same period by Starr and associates [7] consisted of 61 lesions (including other lesions in addition to pulmonary granulomas) that were culturally positive for pathogenic fungi. Structures resembling fungi had been observed previously in sections stained with hematoxylin and eosin and occasionally by the Brown-Breen-Gram, Stoughton, or Best-Bodian method in 30 of these 61 lesions. The PAS stain disclosed structures believed to be fungi in 21 additional lesions. Application of the GMS stain as part of the present study revealed structures morphologically consistent with fungi in six more lesions. Therefore, structures resembling organisms have not been found histologically with any of the staining methods in only four of these 61 culturally positive lesions (table 6).

Comment

For demonstration of acid-fast bacilli in sections of tissue, we prefer the night-blue stain with safranine counterstain to the more commonly used Ziehl-Neelsen stain, since we found that blue-stained acid-fast bacilli are much easier to see than red-stained acid-fast bacilli. Hallberg [5] discussed the many advantages of the night-blue stain in comparison to other acid-fast staining methods.

TABLE 6.—*Demonstration of Fungi in Stained Sections of Tissues from Patients with Positive Cultures for Fungi, Mayo Clinic, 1946-1953*

		Positive on Histological Examination, No.				
Structures Resembling	No. of Sections	Routine Examination	PAS Stain	GMS Stain	Total	Unidentified, No.
Histoplasma capsulatum	18	11	5	2	18	0
Coccidioides immitis	20	6	9	3	18	2
Blastomyces dermatitidis or brasiliensis	15	9	5	1	15	0
Cryptococcus neoformans	3	2	1	0	3	0
Sporotrichum schenckii	5	2	1	0	3	2
Total	61	30	21	6	57	4

Grocott [3a] first suggested using Gomori's methenamine-silver nitrate stain for the demonstration of fungi in tissue. Zimmerman [8] mentioned the various advantages of this technique as compared to methods with other stains for fungi. Since the GMS method affords such a sharp contrast between the fungi, which are stained intensely black, and the background, which is almost colorless, it is possible to find fungi more rapidly and under lower magnification than with other staining methods. Structures believed to be fungi frequently can be demonstrated with the GMS technique when they cannot be found with other staining methods (fig. 6). It is pertinent to emphasize that these organisms are found in the central caseous debris of the granuloma; consequently, it is important that sections be taken to include this central caseous zone. These culturally sterile structures that are only demonstrated by special histological methods are thought to be nonviable fungi that have lost their stainability by ordinary methods.[8]

In the tuberculoma-like type of pulmonary granulomas, which at one time were thought to be pathognomonic of infection with the tubercle bacillus, Myco. tuberculosis was cultured in only 2.2% of lesions; in an additional 1.1% of these granulomas, acid-fast bacilli were observed microscopically but could not be cultured. However, structures resembling H. capsulatum were observed in 72.8% of these tuberculoma-like pulmonary granulomas; in an additional 7.6% of these lesions, structures resembling C. immitis were noted. The tuberculoma-like lesion is assumed to be the healing or healed phase of a pulmonary infection.

Current literature indicates some trend toward the view that improved staining methods can replace microbiological techniques. However, special stains are capable of demonstrating only a few of the specific pathogens, whereas the problem in a granulomatous lesion is to demonstrate one of a wide variety of causative agents. Multiple organisms occasionally are isolated from a single granuloma. Obviously, large numbers of infections by the tubercle bacilli or brucellar organisms would go undiagnosed if resort to cultural methods were abandoned. Furthermore, even when a fungus can be demonstrated histologically it is often difficult, if not impossible, to identify the genus with certainty by histological examination alone. With the existence of small forms of Blastomyces and large forms of Histoplasma, one might question the validity of any purely morphologic identification of either of these organisms in tissue. On occasion, Blastomyces, Cryptococcus, and Coccidioides have been confused with one another by the surgical pathologist when he observes these organisms in tissues removed at operation. Another pitfall inherent in morphologic methods is the presence of artifacts that may closely simulate certain pathogenic fungi. Finally, in many granulomas, cultures have revealed the presence of a causative organism that had not been observed in sections of tissue stained by multiple special techniques.

Summary and Conclusions

More than half (55.9%) of a series of 138 surgically excised pulmonary granulomas studied at the Mayo Clinic during a two-and-one-half-year period contained "structures" histologically resembling Histoplasma capsulatum or Coccidioides immitis when stained by Gomori's methenamine–silver nitrate (GMS) technique. Extensive efforts to obtain growth of fungi from these structures were unsuccessful. These culturally sterile structures are thought to be nonviable fungi that have lost their stainability by ordinary staining methods.

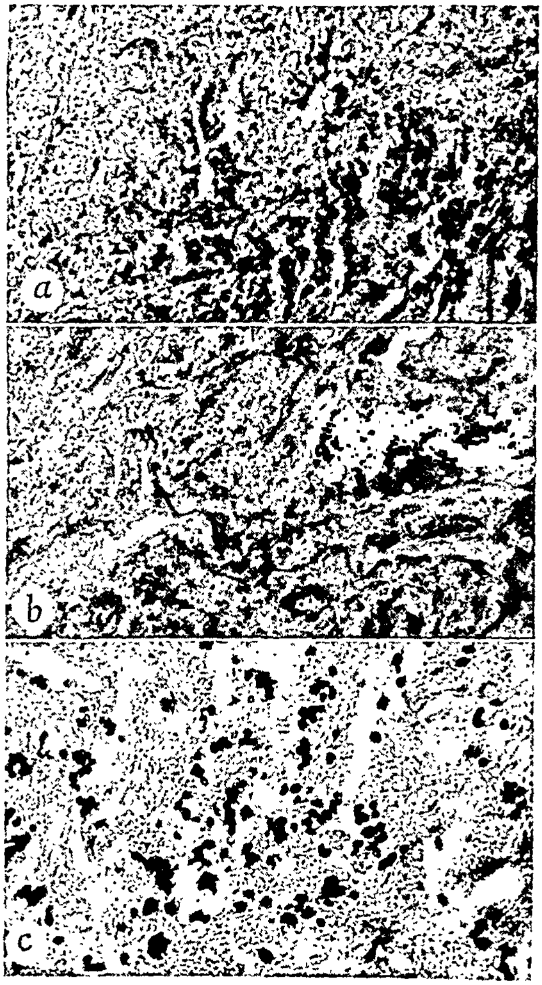

Fig. 6.—Consecutive sections of same area in caseous center of culturally sterile pulmonary granuloma. *a*, hematoxylin and eosin, ×480; *b*, PAS, ×480; *c*, GMS, ×480.

With the GMS stain, fungi can be found in sections of tissue more rapidly and under lower magnification than they can by means of other staining methods. Fungi can be demonstrated frequently with the GMS technique when they cannot be found with other staining methods. Staining methods cannot replace cultural methods; rather, the two methods are supplementary.

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VASCULAR ACCIDENTS TO THE BRAIN STEM ASSOCIATED WITH NECK MANIPULATION

David Green, M.B.
and
Robert J. Joynt, M.D., Iowa City

A woman, aged 31, had nausea, vomiting, slurred speech, and diplopia after vigorous manipulation of the neck during chiropractic treatment. There was weakness of the left arm and leg and decreased sensation for touch and pallesthesia over the left half of the body, including the face. The patient's underlying disease was believed to be multiple sclerosis, but the acute episode represented a brain-stem vascular accident secondary to manipulation of the neck. A man, aged 55, had a similar treatment twice. Signs and symptoms became worse with each manipulation. Examination revealed Horner's syndrome on the left side, paralysis of the left vocal cord, and diminished sensation of pain and temperature over the right half of the body. Manipulation of the neck can significantly narrow the lumen of the vertebral artery, and susceptibility to such accidents may depend on an abnormal vascular supply to the basilar arterial system.

Vascular accidents involving the brain stem after vigorous manipulation of the neck have been reported in the past.[1] The mechanism underlying such a catastrophic event was first suggested by De Kleyn and Nieuwenhuyse[2] in a study conducted on autopsy material. They found that extension of the neck and turning the chin to one side severely compromised the circulation through the opposite vertebral artery. Tatlow and Bammer[3] confirmed these findings and supplied postmortem angiographic evidence showing narrowing of the vertebral artery at the atlanto-occipital joint during extension and rotation of the head.

We have recently encountered two examples of this disorder. They are unusual in that the first patient had an underlying neurological disease and had the acute vascular signs engrafted on this. In the second patient, the signs and symptoms progressed successively with each manipulation. Also, the second patient reported pallesthesia (sensation experienced at a point remote from that stimulated), which is infrequently seen with brain-stem lesions.[4]

Report of Cases

Case 1.—A woman, aged 31, was admitted to the University Hospital on June 31, 1957. There was a 10-year history of intermittent diplopia and blurring of vision, with a tentative diagnosis of multiple sclerosis. One week prior to admission, she had a chiropractic adjustment for abdominal distention. Immediately after vigorous manipulation of her neck, she became violently dizzy, vomited, and lost power and sensation in the left arm and leg. Nausea and vomiting persisted for two days along with slurred speech and diplopia.

From the Department of Neurology, State University of Iowa.

On her initial examination one week after the onset, there was weakness and clumsiness of the left arm and leg and decreased sensation for touch, pain, and pallesthesia over the left half of the body, including the face. The Romberg sign was present, nystagmus was noted on left and right lateral gaze, and a Babinski toe sign was present on the left. Results of laboratory studies were normal except for a first-zone rise in the spinal fluid colloidal gold curve. Roentgenograms of the cervical vertebrae, including views of the odontoid process, were normal. Over the next few months, there was almost complete recovery of the strength and sensation in the left arm and leg. The subsequent course of the condition made us feel that the patient's underlying disease was multiple sclerosis but that the acute episode represented a brain-stem vascular accident secondary to manipulation of the neck.

Case 2.—A man, aged 55, was admitted to the Veterans Administration hospital on Aug. 2, 1957. He had sought chiropractic treatment two weeks before for a "strained back and stiff neck." He had been placed on his stomach and his head was rotated to the right and left until his neck "popped." One-half hour after the treatment, he staggered when attempting to walk and could not place his right leg properly. The next morning, the right arm was numb. The following day, he had a similar adjustment, and after this his whole right side was insensitive to pain and he could not discriminate temperature changes, but he maintained the sensation of touch. The right side of the forehead was also numb, the left side of the face did not sweat, and his voice was hoarse.

His admission examination revealed Horner's syndrome on the left, peripheral-type weakness of the left side of the face, deviation of the palate to the right, paralysis of the left vocal cord, weakness of the right arm and leg, diminished pain and temperature (but not touch) over the right half of the body, and slight hypalgesia and hypesthesia of the right side of the forehead. When the right side of his chest was touched, he felt a lightning-like sensation at a similar spot on the left side. Laboratory examinations were normal except for a slightly elevated blood sugar level. Roentgenograms of the cervical vertebrae were interpreted as showing osteoarthritis with lipping of the vertebral bodies. The findings did not change during his hospitalization.

Comment

As it can be readily demonstrated that manipulation of the neck can significantly narrow the lumen of the vertebral artery,[3] it is unusual that only two such cases have been seen in recent years. The chiropractic method was started in Iowa, being introduced near the turn of the century. It is exceptional to interview a patient on the neurological service who has not at some time had one or several neck manipulations. The rarity of vascular accidents, therefore, must stem from one or more of the following conditions being present in the affected cases: 1. The manipulation is unusually violent. 2. The bony structures in apposition to the vertebral arteries must be abnormal by virtue of congenital or degenerative changes. 3. There is underlying vascular disease such as atherosclerosis. 4. There is an abnormal vascular pattern, such as one vertebral artery or one effective vertebral artery which constitutes the major blood flow into the basilar system.

Judging from the vivid descriptions of a typical adjustment, it would seem that there is no paucity of vigorous neck manipulations. Thus, this is probably not a significant factor. Roentgenograms of the cervical vertebrae for the two patients reported on here and for most of the other cases mentioned in the literature have been normal or, at most, showed some osteoarthritis. This does not rule out some subtle change at the atlanto-occipital region, but it is unlikely. The ages (32, 35, 35, 37, 41, 28, 31, and 55) of the patients reported on here and in the literature fell mainly in the fourth decade, so that the presence of advanced atherosclerosis is probably not a determinant. The last possibility, an abnormal vascular pattern, was suggested by De Kleyn and Nieuwenhuyse[2] to account for dizziness and nystagmus in some of their patients when the head was placed in certain positions in relation to the trunk. They found that occasionally one vertebral artery was much larger and reasoned that occlusion of this would embarrass the blood supply of the brain stem. This last explanation seems most likely to account for the reported complication and also for the rarity of brain-stem vascular accidents after manipulations in a population which is overly exposed to such treatment.

Summary

Two patients developed symptoms and signs suggestive of brain-stem vascular accidents after chiropractic manipulation. Other investigators have shown that the vertebral arteries may be compressed during such manipulations. The rarity of this occurrence is ascribed to the fact that the susceptible patient may have an abnormal vascular supply to the basilar arterial system.

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INTRADERMAL IMMUNIZATION AGAINST ASIAN INFLUENZA IN CHILDREN

Robert C. Rendtorff, M.D., D.Sc., Lillie C. Walker, M.D., Ph.D., M. Eloise Rowland, Ph.D.
and
Henry Packer, M.D., Memphis, Tenn.

The effectiveness of intradermally injected vaccine against Asian influenza was studied in an orphanage in Memphis, Tenn., with 168 children between the ages of 1 and 17 years. A single lot of monovalent Asian strain type A influenza vaccine containing 200 chick cell agglutination units per milliliter was used throughout the study. The outbreak of influenza in the orphanage began on the same day as in the city of Memphis. Four cases occurred before the first injection, 17 between the first and second, and 5 after the second. The outbreak in the orphanage had substantially ceased before the citywide epidemic had reached its peak. Comparison of the hemagglutination-inhibition titers of serum samples obtained before and after the injections, with a consideration of the time relation of the cases among the different age groups in the orphanage, indicated that the vaccine was effective when given intradermally.

Vaccination has proved to be the only effective method of control against influenza. Because of the possibility of sudden antigenic changes in the virus and the greater effectiveness of a homologous vaccine against the current strain, there may not be time, in the face of an epidemic caused by a new variant of the virus, to prepare sufficient vaccine to protect large population groups. Under such circumstances more persons could be immunized by the intradermal route, which requires less vaccine, if this is proved to be as effective as the conventional subcutaneous route. Whether or not the intradermal route is an effective method of immunization for adults has not been definitely established. However, this method has been a recommended procedure for young children [1] and deserves further study for reasons mentioned above.

During the 1957 Asian influenza outbreak in Memphis, Tenn., we were requested to vaccinate the children of an orphanage. This afforded an opportunity to observe the effectiveness of Asian influenza vaccine given intradermally in the face of an epidemic, and this paper summarizes our experiences.

Materials and Methods

Population.—This study was conducted in an orphanage with 168 children between the ages of 1 and 17 years. Infants under 1 year were not included in the study; however, those from 6 months to 1 year of age were immunized. The orphanage separated the children by age groups for convenience of their care. Two groups of preschool-aged children of mixed sexes, those between 1 and 3 years of age and those between 3 and 6 years of age, were located in a separate building. These had separate dining rooms and play rooms, and they slept, on different floors, in rooms containing two to three beds. The youngest group was supervised by a registered nurse. The girls of the oldest age group (10-17 years) helped to bathe and dress the younger children each evening, which resulted in daily mixing between these age groups.

The school-aged children were divided into two groups, aged 6-10 and 10-17 years, who lived in an area separated from the younger age groups. These two groups of older children took meals in a communal dining room. The dormitories were large,

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From the Division of Preventive Medicine, University of Tennessee College of Medicine.

unpartitioned rooms, one each for boys and girls of the 6-10-year group and one each for boys and girls of the 10-17-year group. The children of the first four grades (6-10 years) attended school on the premises of the orphanage. The older children went to public or parochial schools in the city.

There were two visiting Sundays a month and much interval visiting to the institution. Thus the children, particularly the older children, had considerable contact with people outside of the orphanage.

Vaccination.—The first dose of vaccine was given to the children between Oct. 18 and 22. A single lot (035331-B) of monovalent Asian strain type A influenza vaccine containing 200 chick cell agglutination (CCA) units per cubic centimeter was used throughout the study. One-tenth cubic centimeter was given intradermally on the flexor surface of the forearm, and this dose was repeated in seven or eight days.

TABLE 1.—*Clinical Cases of Influenza Among 168 Orphanage Children by Date of Appearance and of First and Second Doses of Asian Strain Vaccine*

Age Group, Yr. (No. of Children)	Date													Total Cases	
	10/15	10/18	10/19	10/20	10/22	10/23	10/24	10/25	10/26	10/29	10/30	10/31	11/8	No.	%
1-3 (22)															
Dose no.		1						2							
No. of cases	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3-6 (40)															
Dose no.		1						2							
No. of cases	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6-10 (58)															
Dose no.					1						2				
No. of cases	0	0	0	0	0	0	0	0	0	2	1	4	0	7	12.1
10-17 (48)															
Dose no.			1						2						
No. of cases	4	0	0	2	0	6	3	2	1	0	0	0	1	19	39.6

Only 13 of the total population of 168 children failed to receive the two doses of vaccine. Of these, four had the original cases of illness in the 10-17-year age group, becoming ill Oct. 15-16; five were in children in the older age groups who became ill after their first dose of vaccine and were not given the second dose; and four were children who escaped vaccination due to circumstances beyond control. All of the orphanage personnel, except one maid, were given similar vaccine from another source at the same time the children were vaccinated. Children newly admitted to the orphanage were vaccinated as they arrived.

Clinical Follow-up Study.—Clinical observations were made daily by the pediatrician (L. C. W.) during the period of study, which was from Oct. 15, 1957, to Nov. 25, 1957, although clinical observation was carried out beyond this period. In addition to noting evidences of clinical disease, attention was given to both systemic and local reactions to the vaccine. The local reactions were recorded after 24 hours, again at 3 or 4 days, at 7 days, and, finally, at 30 days after vaccination.

Laboratory Methods.—Virus isolations were attempted in some cases of clinical illness. Throat washings were inoculated into the amniotic sac of 10-to-11-day-old hen eggs, and viruses isolated were typed for final identification by the laboratory of the Tennessee Department of Public Health.

Blood specimens were taken immediately prior to vaccination and again one month later. Serums were separated within 24 hours and stored at −20 C until tested. Hemagglutination-inhibition (HI) tests were performed on these serums by the standard reference technique with chicken red blood cells.[2] Asian influenza virus strain A/Japan/305/57 in the seventh pure-line egg passage was used in these tests.

Results

The first cases of illness suggesting influenza were observed on Oct. 15 and 16, 1957, in four girls in the 10-17-year age group. The onset was sudden, with rise in temperature to 102 F (38.9 C), headache, malaise, myalgia, and cough. They were not observed to have coryza or red throats. No virus isolations were attempted on these children; however, serologic findings were indicative of Asian influenza, showing at least a fourfold rise in the HI titer. These initial cases occurring in the orphanage corresponded in occurrence to a widespread outbreak in the city of Memphis. Unpublished data on absenteeism among school children collected by Dr. Nobel W. Guthrie of the Memphis-Shelby County Health Department indicate that this community outbreak of influenza began about Oct. 14-15 and reached a peak about Nov. 4, 1957.

Vaccinations were begun on the younger children in the orphanage on Oct. 18, after the occurrence of the above cases, and all of the other children and personnel received their first immunization by Oct. 22. The second doses of vaccine were given between Oct. 25 and 30. Thus, the entire orphanage population, with the minor exceptions noted previously, was protected by vaccination, but not until after clinical cases of influenza had appeared in the older group and in the community. Table 1 shows the dates of vaccination and the occurrence of clinical cases of influenza among children in each age group.

Seventeen clinical cases of influenza occurred between the first and second doses of vaccine. These were in 12 girls and 1 boy in the 10-17-year group. Three were so mild that they would not have been called influenza in the absence of the outbreak. Another boy in the 10-17-year group had been newly admitted and received the first dose of vaccine four days before developing influenza. Also, three girls in the 6-10-year age group became ill after the first dose of vaccine. Throat washings were collected on 11 of these 17 children, and 7 of these yielded Asian strain influenza on isolation.

Five cases of influenza occurred after the second dose of vaccine. Four of these five cases occurred the day after the second dose, and these were among children in the 6-10-year group. Two girls and two boys were ill. One girl and one boy were so mildly ill that their illnesses would not have been called influenza in the absence of the epidemic. Asian influenza virus was isolated from both of these.

The fifth case occurring after the second dose of vaccine was in a boy in the 10-17-year age group who became ill on Nov. 8, 1957. His case represents the last illness observed in the orphanage and the only case occurring after the second dose of vaccine was presumed to be effective. This case was very mild, with rise in temperature to 102.8 F (39.3 C), and lasted only 36 hours. Virus was not isolated from a specimen taken during his illness.

TABLE 2.—*Local Reaction to Intradermally Given Influenza Vaccine*

	1st Dose						2nd Dose					
		Reaction* After 24 Hrs., No.				Papules† Present After 1 Wk., No.		Reaction* After 24 Hrs., No.				Papules† Present After 1 Wk., No.
Age Group, Yr.	No. of Children	0	1	2	3		No. of Children	0	1	2	3	
1-3	22	0	13	9	0	0	20	0	7	12	0	8
3-6	40	0	15	22	3	0	39	0	17	18	4	14
6-10	58	0	17	25	16	7	55	0	20	26	9	24
10-17	45	0	7	15	23	0	41	0	8	11	23	7
Total	165	0	52	71	42	7	155	0	52	67	36	53

* 0 = No redness, no induration; 1 = pink, slight induration up to 15 by 15 mm.; 2 = red, indurated up to 25 by 30 mm.; 3 = red, induration greater than 25 by 30 mm.

† More than temporary induration, persisting as small nodule with brownish pigmentation.

The influenza morbidity for each age group revealed that 19 of 48 children (39.6%) in the 10-17-year group, 7 of 58 (12.1%) in the 6-10-year group, and none in the two younger age groups (1-3 and 3-6 years) became ill. It is important to note that the younger children were known to have been exposed to influenza even though no clinical influenza developed among them. One of the older girls in the 10-17-year age group, who became ill on Oct. 15, and another girl of this group, who became ill on Oct. 24, until they exhibited severe clinical manifestations of illness bathed and dressed the younger children each evening. Also, two other adults in charge of the preschool-aged children developed mild clinical influenza confirmed by serologic evidence of Asian strain virus. These persons were in constant association with the infants and younger children during their own illnesses, which occurred in late October after they had received their second dose of vaccine.

It is also noteworthy that the children in the 3-6-year age group had been under intensive observation during a special study of respiratory diseases for 10 months prior to and concurrent with the present study. None of these developed disease which could be considered to be even mild or atypical influenza, although some did show rhinitis with cough, fever, or malaise. These illnesses were no different from numerous such episodes experienced during the year. In fact, this group was remarkably free of all respiratory symptoms during the period of the present study. Although no definitive data are available regarding the incidence of clinical influenza among children under 6 years of age in the population of the city during the epidemic, it is our opinion, and that of pediatricians practicing in the community, that this age group was not spared from attack.

The duration of illness in the first cases observed was three to five days, usually three days, with the height of febrile response on the second day. It has already been noted that 5 of the 26 cases were of such a mild character that the diagnosis of influenza would probably not have been made in a nonepidemic year. In fact, no cases were considered severe, and no complications occurred. Immunization may have contributed to this.

There were only 6 systemic reactions to the antigen out of 320 immunization procedures. Four of these were after the first dose and two after the second. These consisted of malaise, anorexia, headache, and temperature rise to less than 100 F (37.8 C), with a duration of less than 24 hours. None of the children was known to be sensitive to eggs, and no immediate local protein reactions were seen, although some were observed in a group of medical students receiving the same antigen intradermally. Careful attention was given to the long-term effects of the local injection of the vaccine because of the persistence of the papule formed by the vaccine and the fact that this sometimes developed a brownish pigmentation which might cause concern from a cosmetic standpoint. The extent and character of these reactions are presented in table 2. These papules generally disappeared by six weeks, but the pigmentation persisted in some children at least up to three months and was usually about 3 to 5 mm. in diameter. In no case was it considered a contraindication for the use of the vaccine by the dermal route. It is evident from these data that the older children are apt to develop a more severe temporary reaction. Formation of pigmented papules has not been observed by one of us (L. C. W.) in persons receiving influenza vaccine intradermally from other sources.

The results of the HI tests performed on the youngest three age groups (1-3, 3-6, and 6-10) are presented in table 3. The 10-17-year age group is not included because of difficulties beyond our control in obtaining specimens. Since the illnesses had all occurred before the second dose of vaccine could be expected to be effective, the seven children in the 6-10-year age group with influenza are presented separately in the table from the others who did not become ill. The prevaccination titers were negative in all children in a 1:5 dilution, except for a single patient in the 6-10-year age group whose titer was 1:10. Postvaccination titers were not high but did show the effect of antigenic stimulation. A considerable number (92.7% of the total group) showed a twofold or greater rise in antibody titer, and 55.2% showed a fourfold or greater rise. The 6-10-year age group showed a greater response than either of the two younger age groups with regard to a fourfold or greater rise.

Comment

The pattern of the Asian influenza outbreak among these 168 orphanage children seems to have been influenced by the concurrent administration of the two doses of homologous virus vaccine given intradermally. The following points seem to suggest this.

First, both clinical and serologic evidence indicate that no Asian strain influenza had occurred in the children under 10 years of age up to the time they received the first dose of vaccine.

Second, a very large portion of all children showed at least a twofold rise in HI antibody titer by three weeks after the second dose. Among the children of the 6-10-year age group who did not develop clinical influenza, 78.7% showed at least a fourfold rise in HI antibody titer after receiving the second dose of vaccine. The fourfold or greater rises in HI antibody titer among the 1-3-year and 3-6-year age groups was 20.8 and 33.3% respectively. Since clinical influenza occurred in the 6-10-year age group, it is possible that inapparent infections may have contributed to the higher conversion rate or, possibly, the older children responded better in production of antibody. Conversely, children in the younger age groups either produced antibody poorly or did not have inapparent infections.

Third, the outbreak in the orphanage began in the older children Oct. 15-16, the exact time of the beginning of the epidemic in the city. A total of 19 cases (39.6%) occurred in children in the 10-17-year age group, and all but a single case occurred before the second dose of vaccine was given. The next younger age group experienced clinical influenza after it had subsided in the older age group. A total of seven (12.1%) in the 6-10-year age group were affected, and again the cases all occurred before the second dose of vaccine could become effective. No cases occurred in the two youngest age groups, 1-3 and 3-6 years of age, even though there was known contact with children with clinical cases who were harboring the virus.

Table 3.—*Increase in Hemagglutination Antibody Titer and Geometric Mean Titer to Asian Strain Influenza in Orphanage Children Three Weeks After Second Intradermal Dose of Homologous Vaccine*

		Rise in Titer				
		2-Fold or Greater		4-Fold or Greater		
Age Group, Yr.	No. of Children	No.	%	No.	%	Mean Titer*
1-3	24	22	91.7	5	20.8	5.35
3-6	18	15	83.3	6	33.3	4.82
6-10						
Not ill	47	45	95.7	37	78.7	9.62
With influenza	7	7	100.0	5	71.4	12.60
Total	96	89	92.7	53	55.2	

* Reciprocals of mean titer. 0 equals <1:5, lowest dilution tested. Prevaccinal titers were all <1:5 with 1 exception.

Fourth, the epidemic in the city continued among school children, and the peak of the epidemic was reached about Nov. 4, 1957, and tapered off subsequently. All cases in the orphanage occurred between Oct. 15 and 31, except for a questionable single mild case on Nov. 8, 1957. It would appear, then, that the orphanage outbreak had substantially ceased before the citywide epidemic had reached its peak.

Interest in the intradermal route for vaccination of children against influenza was heightened during the recent Asian influenza epidemic primarily because of shortage of vaccine and the fact that children tend to exhibit reactions to large doses of vaccine given subcutaneously. The efficacy of the intradermal route for immunization against other diseases has been pointed out in the past, and it was considered important to reevaluate this method of injection in influenza.[3] Some studies have shown that the antibody response to 0.1 or 0.2 ml. of vaccine given intradermally as a single dose or in two doses of the same amount given approximately one week apart compares very favorably with 0.5 to 1.0 ml. given subcutaneously.[4] Others[5] indicate that this may not be the case. The recent studies of McCarroll and Kilbourne[6] suggest that the division of the vaccine into two doses given one week apart subcutaneously will induce an antibody response superior to that of a single injection by the same route containing the same total dose. They also compared 0.1-ml. and 0.2-ml. doses by both intradermal and subcutaneous routes and found the latter route at least equal in antigenic efficiency. This would seem to indicate that the timing of the injections may be more important than the route of inoculation of small dosages. This important observation deserves further study. Davenport,[7] noting the failure to produce over 10 million doses of vaccine for civilian use prior to the epidemic peak of Asian influenza in 1957, suggests that reliance can not be placed on strain-specific vaccine and a second approach, namely, a panvalent vaccine, may achieve our objectives to control influenza.

Glazier[8] has recently reported immunization against influenza in children to be effective in the face of an epidemic. Of particular interest in relation to the present study are his group-3 cases. None of 241 children in this group who received 0.03 ml. of influenza A and B vaccine intradermally, followed within seven days by 0.5 ml. given subcutaneously, just prior to or at the beginning of the epidemic developed influenza. Of 61 children in the same group who received only the initial dose, 7 developed influenza. In his control group of 122 unimmunized children, 21 had moderate or severe influenza during the epidemic.

Our observations on the course of the influenza outbreak in an orphanage, presented here, appear to indicate that the intradermal route was effective in preventing the spread of the disease to younger age groups, although other factors may possibly have played a role. Our experience justifies continued use of the intradermal route in children and further studies of its effectiveness in older age groups.

Summary

Homologous Asian strain influenza vaccine was given intradermally in two 0.1-ml. doses one week apart to 168 orphanage children from 1 to 17 years of age during the early phase of an outbreak of Asian influenza. All clinical cases of influenza occurred before the second dose of vaccine could become effective, except for a questionable mild case which occurred later. The cases were confined to the older children, with 40% of those in the 10-17-year age group and 12% of those in the 6-10-year age group becoming ill. No cases occurred among the children under 6 years of age. Hemagglutination-inhibition titers were studied on prevaccinal and postvaccinal serum samples, and reactions to the vaccine were noted. The data appear to substantiate the effectiveness of intradermal vaccination against influenza in children in an epidemic situation.

62 S. Dunlap St. (3) (Dr. Rendtorff).

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The Asian influenza vaccine used in this study was supplied by Parke, Davis & Company, Detroit.

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EXPERIENCES WITH GENERAL ANESTHESIA IN PATIENTS WITH FAMILIAL DYSAUTONOMIA

Marilyn M. Kritchman, M.D., Herman Schwartz, M.D.
and
Emanuel M. Papper, M.D., New York

The syndrome familial dysautonomia includes a combination of congenital abnormalities and clinical manifestations that make a patient a poor candidate for general anesthesia. Striking features are indifference to pain and diminished lacrimation, which predispose to corneal ulceration, and poor vasomotor control, which predisposes to hypertension during emotional crises and to hypotension during anesthesia. Three cases are described in detail. Among eight patients in whom this syndrome was observed, severe hypotension during anesthesia occurred six times and cardiac arrest twice. When this condition is suspected, a complete preoperative evaluation is needed. Patients who have this condition do not tolerate thiopental sodium or tribromoethanol as anesthetic agents. If local anesthesia after premedication with chlorpromazine is not suitable, the alternative is premedication with chlorpromazine and belladonna drug followed by a volatile general anesthetic.

Since 1949, when familial dysautonomia was described by Riley and co-workers,[1] eight patients with this disease have been anesthetized for 27 surgical procedures at the Columbia-Presbyterian Medical Center. The morbidity from the anesthesia in these patients was high. The difficulties in providing anesthesia safely were serious. Since the disease is rare and the opportunities to administer anesthesia unusual, a review of the problems presented and the details of anesthetic management appeared desirable.

Diagnosis

Familial dysautonomia is a congenital condition frequently seen in siblings and characterized by specific disturbances of the nervous system. The most striking clinical manifestations are associated with aberrations in autonomic nervous system function. All responses to sensory stimuli appear to be either particularly exaggerated or absent. Almost all of the reported patients are small in stature and undernourished. The age at which they have been seen has rarely exceeded 20 years, the majority ranging from 1 to 12 years of age. Many deaths have occurred in the first two to three years of life, but many such patients appear capable of indefinite survival. The oldest currently is 27 years of age.

Table 1 outlines the salient features of the disease.[2] Certain characteristics are more pertinent to the anesthetic management and bear emphasis. Among the disorders of the autonomic nervous system, peripheral vascular dysfunction is prominent. These patients exhibit skin blotching with excitement or ingestion of food. Hypertension in response to emotional stimuli is usually, though not always, present.

Normal individuals show a slight rise in both systolic and diastolic pressures when changing from the supine to the erect posture. In contrast, these patients show a fall in systolic and an even more striking fall in diastolic pressure during the same change in posture. All of the reported patients have exhibited postural hypotension.[3]

Especially in the early years, bronchopneumonia and atelectasis are apt to occur. Moloshok and Moseley [4] believe this is a consequence of excessive mucoid secretions. According to Riley,[2] however, a poor swallowing reflex with aspiration of food or secretions probably is an important contributing factor. As the children grow older, pulmonary complications tend to diminish.

Poor temperature control is another feature of the disease, and even mild infections are accompanied by high fevers. At times, bouts of elevated temperature occur with no overt evidence of infection. Fever and the vomiting which is characteristic of the syndrome often complicate the postoperative period.

The sensory disturbance of importance is indifference to pain. This is not true anesthesia, since the patients can readily identify pin prick. It represents a lack of awareness of discomfort. The diminished lacrimation and corneal anesthesia which are present contribute to the frequency of corneal ulceration. Healing of corneal ulceration is slow and often requires surgical creation of intermarginal lid adhesions.[5] Other characteristics of the disease include poor muscle coordination with absent or hypoactive deep tendon reflexes, dysarthria,

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From the Department of Anesthesiology of the College of Physicians and Surgeons, Columbia University, and the Anesthesiology Service of the Presbyterian Hospital.

emotional lability, and drooling beyond the usual age. Death usually occurs after infection or aspiration of vomitus.

There is no satisfactory treatment at the present time. Prefrontal lobotomy, electroshock, tentorial splitting, and lumbar sympathectomy have all failed. Chlorpromazine has proved useful for the treatment of prolonged vomiting. If given at the onset of an attack in combination with phenobarbital, the vomiting is often stopped and the period of disability seems shortened.

Thirteen postmortem examinations have been reported without evidence of consistent or characteristic abnormalities of the central nervous system. Three showed brain lesions, one had a thalamic cyst destroying the dorsal medial nucleus, one had marked degenerative changes in the reticular substance of the pons and medulla, and one had multiple brain abscesses.[6] Psychiatric studies reveal a behavior pattern most closely resembling that of children who suffer from diffuse organic disorders of the brain.[7] To account for the widespread central and peripheral involvement, Riley [2] and others have postulated a fundamental enzyme disturbance in the nervous system as the causative factor.

Table 1.—*Clinical Features of Familial Dysautonomia**

Disturbances of autonomic nervous system	
Reduced or absent tears when crying	+++
Peripheral vascular disturbances	
Hypertension with excitement	++
Skin blotching	++
Cold hands and feet	+++
Excessive perspiration	+++
Erratic temperature control	++
Disturbed swallowing reflex	+++
Diarrhea or constipation	±
Drooling	++
Disturbances of voluntary neuromuscular system	
Absent or hypoactive deep tendon reflexes	++
Poor motor coordination	+++
Dysarthria	+++
Muscular imbalance	
	+
	++
	±
	++
St	
	+++
Corneal anesthesia	++
Dysesthesia	+
Proprioceptive disturbances	+
Psychological disturbances	
intellectual capacity	++
n infancy	++
iting	+++
severe degree	++
involving central nervous system	
Corneal ulceration	+
Frequent bronchopneumonia	++
Retardation of growth	++
Increased tendency to bodily injury	+
Allergic manifestations	±
Factors suggesting genetic origin	
Jewish extraction	++(?+++)
Occurrence in siblings	++(25-35%)
Consanguinity of parents	+
Occurrence in related families	+
Occurrence in forebears	0

* From Riley.[2] Key: 0 = not seen in any cases so far known; ± = seen in some cases, but not frequently enough to be remarkable; + = occurs more frequently than expected in the general population, but still not common; ++ = occurs frequently, but not so regularly as to be required for diagnosis; +++ = probably present in all cases, though future experience may reveal exceptions.

Analysis of Cases

Eight patients ranging in age from 9 months to 12 years received general anesthesia 27 times for a variety of surgical procedures (table 2). Preanesthetic medication with a belladonna derivative alone was administered in 11 cases, an opiate combined with belladonna in 4, barbiturate and opiate with belladonna in 5, barbiturate with belladonna in 2, chlorpromazine combined with an opiate and belladonna in 1, and chlorpromazine combined with a barbiturate and belladonna in 1. In the remaining three cases no premedication was used.

Different anesthetic agents were tried. Tribromoethanol (Avertin) alone was used three times, and tribromoethanol followed by diethyl ether was used five times. Vinyl ether followed by diethyl ether was administered twice, cyclopropane followed by diethyl ether in two cases, and ethyl chloride followed by diethyl ether twice. Diethyl ether was given alone in six cases, thiopental sodium followed by nitrous oxide-oxygen in four, tribromoethanol followed by thiopental sodium and nitrous oxide-oxygen in one, thiopental sodium alone in one, and open insufflation of cyclopropane in one.

Complications during anesthesia were frequent and related specifically to the cardiovascular system. Severe hypotension occurred six times, once requiring cancellation of the operative procedure. Hypotension resulted in two instances of cardiac arrest, with successful resuscitation by cardiac massage and efficient ventilation with oxygen.

The most prominent postoperative complication was pulmonary. Bronchopneumonia was present five times in this series, accompanied twice by atelectasis. Two patients exhibited cyanosis during the recovery from anesthesia. There were three patients who developed the cyclic vomiting and spiking temperatures characteristic of this disease. The following three case reports are described in detail to illustrate the cardiovascular collapse which may occur.

Report of Cases

Case 1.—An 18-month-old girl, weighing 12 lb. (5.4 kg.), had the characteristic clinical signs of familial dysautonomia. She was undernourished and dwarfed and had frequent bouts of vomiting and bronchopneumonia and a labile hypertension. An arthrogram was scheduled to establish the diagnosis of congenital hip dysplasia. On two previous occasions the procedure was canceled because of persistent bronchopneumonia. On this occasion a preoperative chest film showed normal findings. Scopolamine, 0.2 mg., was given one hour before operation. The patient arrived in the operating room with a dry mouth and was crying. After a cut-down incision for intravenous cannulation was performed with use of local anesthesia, 2 cc. of a 1.25% solution of thiopental sodium was injected intravenously. A mask was applied, and a mixture of 60% nitrous oxide and 40% oxygen was administered through a nonrebreathing system. A metal oral airway was inserted after 12.5 mg. more of thiopental sodium had been given. The patient coughed twice and became apneic, although the airway was clear and the chest easily inflated. The pulse slowed to 10 beats per minute, and the blood pressure could not be measured. Positive pressure oxygen was given by mask, and ephedrine (5 mg.) was in-

TABLE 2.–*Results of General Anesthesia in Eight Patients with Familial Dysautonomia*

Case No.	Age at Operation, Yr.	Symptoms	Operation	Premedication	Anesthetic Agent	Complications	
						Anesthetic	Postoperative
1	2	Hypertension, pulmonary symptoms	Arthrogram	Scopolamine, 0.2 mg.	Thiopental sodium, nitrous oxide-oxygen	Hypotension	Cyclic vomiting, aspiration pneumonia
2	7	Hypertension	Myelogram	Morphine sulphate, 3 mg.	Tribromoethanol (Avertin), 100 mg./kg. of body weight	None	None
			Correction of varus deformity of right foot	Meperidine (Demerol), 10 mg., scopolamine, 0.2 mg.	Cyclopropane, nitrous oxide-oxygen, ether	None	Cyanosis in recovery room
3	1⅙	Pulmonary symptoms	Suture of tongue	Chlorpromazine (Thorazine), 10 mg., secobarbital (Seconal), 15 mg., scopolamine, 0.2 mg.	Vinyl ether (Vinethene) nitrous oxide-oxygen	Labile pulse	None
4	6	Hypertension, pulmonary symptoms	Stellate block	None	Cyclopropane	None	None
			Creation of lid adhesions	Secobarbital, 60 mg., scopolamine, 0.25 mg.	Vinyl ether	None	None
	7		Lysis of adhesions	Secobarbital, 60 mg., scopolamine, 0.2 mg., morphine sulphate, 3 mg.	Tribromoethanol, 50 mg./kg. of body weight, ether	None	None
5	1½	(Normotension, no pulmonary symptoms)	Creation of lid adhesions	Atropine, 0.1 mg.	Ethyl chloride, ether	None	None
	5½		Lysis of adhesions	Meperidine, 20 mg., scopolamine, 0.2 mg.	Tribromoethanol, ether	None	None
6	9	Hypertension, pulmonary symptoms	Topectomy	Morphine sulphate, 7 mg., scopolamine, 0.3 mg.	Tribromoethanol, 70 mg./kg. of body weight, thiopental sodium, nitrous oxide-oxygen, meperidine	Hypotension, cardiac arrest	Bronchopneumonia with atelectasis, cyclic vomiting
	10		Lobotomy	Amobarbital (Amytal), 100 mg., meperidine, 50 mg., scopolamine, 0.3 mg.	Thiopental sodium, vinyl ethyl-ether, nitrous oxide-oxygen	Hypotension	Bronchopneumonia with atelectasis
7	6	(Normotension, no pulmonary symptoms)	Creation of lid adhesions	Meperidine, 25 mg., chlorpromazine, 10 mg., scopolamine, 0.2 mg.	Cyclopropane, nitrous oxide-oxygen, ether	None	None
8	¾	Hypertension, pulmonary symptoms	Creation of conjunctival flap	Atropine, 0.1 mg.	Ether	None	Bronchopneumonia
	1		Release of conjunctival flap	Atropine, 0.1 mg.	Ether	None	None
	2		Creation of lid adhesions	Atropine, 0.1 mg.	Ether	None	None
	2½		Release of adhesions	Atropine, 0.1 mg.	Ether	None	None
	3		Creation of adhesions	Atropine, 0.1 mg.	Ether	None	None
	3		Creation of lid adhesions	Atropine, 0.1 mg.	Tribromoethanol, 100 mg./kg. of body weight, ether	None	None
	4		Inversion of eyelashes	Atropine, 0.2 mg.	Tribromoethanol, 100 mg./kg. of body weight	None	None
	4½		Bronchoscopy, bronchography	None	Ethyl chloride, ether	None	Hypotension, cyanosis
	4½		Tonsillectomy, adenoidectomy	Secobarbital, 30 mg., scopolamine, 0.2 mg.	Ether	None	None
			Division of tentorium	Scopolamine, 0.1 mg.	Ether, thiopental sodium, nitrous oxide-oxygen	Hypotension throughout	Febrile for 10 days
	5		Creation of adhesions	None	Thiopental sodium	None	None
	5		Creation of lid adhesions	Atropine, 0.1 mg.	Tribromoethanol, 95 mg./kg. of body weight, ether	None	None
			Creation of lid adhesions	Secobarbital, 45 mg., codeine, 45 mg., scopolamine, 0.3 mg.	Tribromoethanol, 95 mg./kg. of body weight	None	None
	10		Superficial keratectomy	Secobarbital, 50 mg., morphine sulphate, 5 mg., scopolamine, 0.4 mg.	Tribromoethanol, 50 mg./kg. of body weight, nitrous oxide-oxygen, ether	Hypotension	None
	12		Superficial keratectomy	Secobarbital, 100 mg., morphine sulphate, 8 mg., scopolamine, 0.3 mg.	Thiopental sodium, succinylcholine, nitrous oxide-oxygen	Cardiac arrest	Pleural effusion, *pneumonia*, cyclic vomiting

jected intravenously. Within a few moments the blood pressure returned to hypertensive levels, the pulse rate accelerated to 160 per minute, and spontaneous respirations resumed. The procedure was abandoned, and the patient returned to bed fully responding. On the first postoperative day, she aspirated a feeding and developed a complete atelectasis of the right lung. Endotracheal intubation followed by adequate tracheobronchial aspiration produced complete reexpansion of the lung, and she made an uneventful recovery. One month later this patient developed a corneal ulceration. Intermarginal lid adhesions were produced during local anesthesia. Chlorpromazine (5 mg.) was used for premedication.

CASE 6.—A 9-year-old girl, weighing 50 lb. (22.7 kg.), had hypertension, pulmonary symptoms, and cyclic vomiting. In addition she exhibited severe emotional instability. A topectomy was contemplated. Premedication consisted of morphine sulphate, 7 mg., and scopolamine, 0.3 mg., given one and one-half hours before operation. She arrived in the operating room awake and apprehensive. Tribromoethanol, 1.6 Gm. (70 mg. per kilogram of body weight), was given rectally and partially expelled. After a spray of a 2% solution of tetracaine hydrochloride to the larynx and trachea, endotracheal intubation was performed. The endotracheal tube was connected to a Heidbrink circle filter and a mixture of 60% nitrous oxide and 40% oxygen was administered. Supplementary intravenous injections of a 3% solution of thiopental sodium in increments of 60 mg. and meperidine in 5-mg. doses were given. Hypotension developed during the induction and persisted, with a systolic pressure of 80 mm. Hg, in spite of administration of ephedrine (25 mg. intravenously and 25 mg. intramuscularly) and methamphetamine (Methedrine) (5 mg. intravenously). The blood pressure remained at 80/60 mm. Hg for three hours and then fell to 60/40 mm. Hg. By this time, 900 mg. of thiopental sodium and 40 mg. of meperidine had been given. Methamphetamine (5 mg. intravenously) had no effect, and cardiac arrest occurred. The chest was opened, and cardiac massage produced a prompt return of spontaneous beating. The postoperative course was complicated by a right lower lobe atelectasis which responded to antibiotic therapy.

The patient developed a more tractable personality, but this improvement was temporary. Four months later she was scheduled for bilateral prefrontal lobotomy. Premedication consisted of amobarbital (Amytal) sodium, 100 mg. given one and one-half hours preoperatively, and meperidine, 50 mg., and scopolamine, 0.3 mg., given one hour before operation. She was well sedated without appearing depressed. Sixty milligrams of a 3% solution of thiopental sodium was given. Her respiratory rate slowed to 8 per minute and her pulse to 60. Administration of 100% oxygen with positive pressure brought an immediate return of the pulse rate to 120 and respirations to 20 per minute. An open-drop vinyl ether–diethyl ether sequence followed uneventfully. The patient was intubated, and a mixture of 60% nitrous oxide and 40% oxygen was administered through a nonrebreathing system. Thiopental sodium, 30-to-60-mg. increments of a 3% solution, was added, sufficient to prevent movement of the patient. In three hours a total of 450 mg. was given. The blood pressure ranged from 100/60 to 80/50 mm. Hg, the pulse from 80 to 100 per minute, and the respiratory rate from 15 to 20 per minute. The postoperative course was complicated again by a right lower lobe bronchopneumonia and cyclic vomiting.

CASE 8.—A 12-year-old boy, weighing 101 lb. (45.8 kg.), had had 13 surgical procedures with general anesthesia from the age of 9 months until he was 10 years of age. On two previous occasions he developed severe hypotension, once after thiopental sodium administration and once after tribromoethanol and diethyl ether administration. He was scheduled for a superficial keratectomy. Premedication consisted of secobarbital (Seconal), 100 mg. given one and one-half hours preoperatively, and morphine sulphate, 8 mg., and scopolamine, 0.3 mg., given one hour before operation. He arrived in the induction room in an apprehensive state. Thiopental sodium, 150 mg. of a 3% solution and succinylcholine, 40 mg., were given intravenously. Endotracheal intubation was performed after 60 mg. of a 4% solution of cocaine was sprayed into the pharynx and trachea. Anesthesia was maintained with a mixture of 70% nitrous oxide and 30% oxygen administered through a Heidbrink circle filter with an overflow of gas escaping from the system with each breath. Thiopental sodium, 30-to-60-mg. increments of a 3% solution, was used to supplement the nitrous oxide analgesia. A total of 300 mg. had been administered when cardiac arrest occurred suddenly during the operation. There was no detectable preexisting hypotension. The chest was opened and the heart massaged within 60 seconds. Resuscitation was successful, and the patient reacted promptly on discontinuance of the anesthesia. Postoperative cyclic vomiting and a left pleural effusion and pneumonitis were present for one week, followed by complete recovery.

Comment

Patients with familial dysautonomia are grave anesthetic risks. The labile cardiovascular system, frequent bronchopneumonia, hypersalivation with aspiration, hyperemesis, and emotional instability are severe problems for the anesthesiologist.

Preoperative examination must be as complete as possible. In addition to a blood cell count and urinalysis, a chest film is necessary. If cyclic vomiting is present, electrolyte and fluid imbalance must be corrected. Preanesthetic medication with chlorpromazine, 0.5 mg. per pound, is proving valuable both as an emotional stabilizer and as prophylaxis against postoperative vomiting. Enough barbiturate (0.5 mg. per pound) and narcotic (0.05 mg. per pound of morphine or 0.5 mg. per pound of meperidine) should be added to insure a well-sedated patient on arrival in the operating room. The use of a belladonna drug has been questioned by some because of the tendency to thicken bronchial secretions and possibly contribute to atelectasis. However, adequate doses of atropine or scopolamine diminish salivation and provide for smoother induction and maintenance of anesthesia.

The presence of a labile cardiovascular system demands a flawless anesthetic technique with adequate ventilation. Postural hypotension adds to the circulatory problem. Once the patient is anesthetized, positional changes should be avoided if possible. If movement of the patient proves to be necessary, it should be performed very slowly. The blood pressure must be measured frequently to ascertain early hypotensive changes. Hypotension is serious and may be the prelude to cardiocirculatory collapse. Early detection and treatment is essential to prevent complete circulatory failure. Vasopressors, e.g., ephedrine (5 to 25 mg.) and methedrine (2 to 5 mg.), often provide prompt restitution of the blood pressure. Where they fail, a dilute drip of levarterenol (1 to 2 mg. in 500 ml. of a 5% solution of glucose in water) may be tried.

Severe arterial hypotension or cardiac arrest occurred six times in this series. In five of these cases thiopental sodium was given intravenously, and once tribromoethanol per rectum was used. Although ether, vinyl either, or cyclopropane-ether were most frequently used, hypotension was not encountered with these agents. The precise reasons for the difficulties with thiopental sodium and tribromoethanol are unknown.

With only eight cases analyzed retrospectively, no predictably safe method of anesthetic management has been found. The difficulties encountered with the agents previously used suggest that the volatile agents which can be eliminated rapidly are superior to those which are metabolised. Thiopental sodium and tribromoethanol created difficult problems in management and are avoided now. Since an elevated pain threshold is often present, it is possible to perform minor surgical procedures with use of local anesthesia. Four patients, not included in this series, had minor surgery satisfactorily performed with local anesthesia after premedication with chlorpromazine, a barbiturate, and meperidine. In view of the high morbidity with general anesthesia reported here, local anesthesia reinforced with chlorpromazine and sedatives is suggested wherever practical.

Summary

Eight patients with familial dysautonomia received general anesthesia for 27 surgical procedures. Serious morbidity was high. Severe hypotension occurred six times, leading to cardiac arrest twice. Bronchopneumonia was a frequent postoperative complication. All of the cardiovascular problems were associated with the use of thiopental sodium or tribromoethanol (Avertin). As guides to safer management, the following points are suggested: (1) a complete preoperative evaluation, including chest x-ray, (2) premedication with chlorpromazine and a belladonna drug, and (3) use of the volatile anesthetic agents, if local anesthesia after premedication with chlorpromazine is not suitable.

622 W. 168th St. (32) (Dr. Papper).

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TRANQUILLIZERS IN PSYCHIATRY.—There are two groups of drugs, the *phenothiazine compounds and the Rauwolfia alkaloids, which have a specific action* on some of the symptoms of psychosis. Alone or in combination with other drugs they are effective in acute and chronic psychoses mainly characterized by psychomotor overactivity and excitement. States of depression or stupor either do not respond, or are better treated by other means, such as convulsive therapy or analeptics. The neuroses are no more responsive than to other agents. The phenothiazine compounds are in general more effective than the Rauwolfia alkaloids, although individual patients show marked differences in their responses to one or other of the groups of drugs, and combinations of a phenothiazine compound with reserpine or with another phenothiazine compound, e. g. chlorpromazine and pecazine, may be more effective than either singly. Little can be said at present about specific indications for particular drugs. Their action, like the action of other forms of therapy in psychiatry, cuts across diagnostic categories. The most effective dose of both groups is reached at a level where they cause motor slowing and rigidity: a level when Parkinsonian symptoms are appearing. Parkinsonian symptoms can be controlled in some cases with anti-Parkinsonian drugs if it is necessary to maintain a high dosage level. Usually the dose can be reduced once symptoms are under control, and patients may be discharged from hospital and maintained on quite low doses. When patients are discharged from hospital after treatment with tranquillizers, the burden of their supervision usually falls on the general practitioner, although some hospitals are now starting special maintenance clinics for this purpose. It is clearly important that the practitioner should not only recognize the possibility of toxic symptoms, but should also be aware of the importance of maintenance therapy, which for some patients is as important for the control of psychiatric illness as it is in the case of digitalis for the cardiac patient.—D. M. Leiberman, M.D., and G. F. Vaughan, M.B., Tranquillizers, *The Practitioner,* October, 1958.

THE EDUCATIONAL COUNCIL FOR FOREIGN MEDICAL GRADUATES

Dean F. Smiley, M.D., Evanston, Ill.

A system of qualification examinations has been developed in order to insure uniformity and fairness in the testing of foreign-trained physicians for admission to internship or residency training in the hospitals of the United States. The Educational Council for Foreign Medical Graduates (ECFMG) gave its first examinations in 1958. These have been modified in the light of accumulating facts, especially as regards language difficulties. The fourth examination, Sept. 22, 1959, will be given not only in the United States but also in over 50 foreign centers. The candidate who passes can safely assume that his knowledge of medicine and command of English are adequate for him to profit by his experience in this country, and an American hospital accepting him can feel assured that he is qualified to render effective service as intern or assistant resident.

The Educational Council for Foreign Medical Graduates (ECFMG) opened its doors Oct. 1, 1957. On March 25, 1958, it held its first American Medical qualification examination; on Sept. 23, 1958, its second examination; and on Feb. 17, 1959, its third examination.

Qualification Examinations

The first qualification examination was given March 25, 1958, to 298 foreign medical graduates who were already in the United States. It was offered in only 17 U. S. medical schools. Of the 298 taking the examination, 152 (51%) attained a score of 75% or better and were granted standard ECFMG certificates. Only one candidate failed to pass the ECFMG English test.

One fact that came out of this first examination was that many of these foreign medical graduates, even after experience in an American hospital, were slow readers of English. Twenty-eight of them failed to finish the morning portion of the examination and left a block of unanswered questions at the end of that session. As the result of this experience, the total number of questions was reduced from 400 to 360 and an additional time allowance of 30 minutes was added.

The second examination, on Sept. 23, 1958, was given to 844 candidates in about 30 U. S. medical schools and in about 30 examination centers set up in foreign countries with well-instructed American-national proctors in charge.

Of the 844 foreign medical graduates who took this examination, 418 (49.5%) attained a score of 75% or better and were granted standard ECFMG certificates. Of the 844, there were 7 who failed to pass the ECFMG English test and 9 who received a mark of "questionable pass" in it.

This was not too bad a showing for the group as a whole, but further breakdown of the figures showed that for those who took the examination in their home country without ever having had experience in an American hospital, many of them without experience in an English-speaking country, the results were not nearly as favorable. Of the 707 foreign medical graduates taking this examination in the United States, a total of 371 (52.4%) attained scores of 75% or better and 193 (27.3%) attained scores of 70 to 74%. In contrast, of the 137 foreign medical graduates taking the examination overseas only 47 (34.3%) attained scores of 75% or better and only 33 (24.1%) attained scores of 70 to 74%.

Failure to understand English was apparently much more of a stumbling block for the overseas candidate than for the stateside candidate. Of the 137 overseas candidates, 7 failed the ECFMG English test and 3 were listed as "questionable pass." In contrast, of the 707 stateside candidates, none failed the English test and only 6 were listed as "questionable pass."

With all these facts in mind, the ECFMG's Examinations Committee concluded that it would be quite unfair and unwise to exclude from participation in U. S. hospital internship and residency training 65.7% of the foreign-trained physicians applying in their home country, when experience has shown that the majority overcome the language barrier rapidly when once established in a U. S. hospital.

On the recommendation of the Examinations Committee, the Board of Trustees of the ECFMG voted to issue a temporary certificate to those candidates passing the English test and attaining a score of 70 to 74% in the qualification examination. This certificate would be good for admission to

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Executive Director, Educational Council for Foreign Medical Graduates.

internship or assistant residency training for a period not to exceed two years. If, within the two years, the candidate does not retake and pass the examination with a score of 75% or better, he would be expected to return to his home country.

Of the 844 candidates taking the second examination, 418 (49.5%) therefore received ECFMG standard certificates and 226 (26.8%) received ECFMG temporary certificates. Eighty (58.4%) of the 137 candidates taking the examination overseas obtained certificates declaring them qualified to undertake hospital training in the United States. Of the overseas candidates, 34.3% won standard certificates and 24.1% won temporary certificates.

The third examination was given Feb. 17, 1959, to 1,772 foreign medical graduates in 33 examining centers in the U. S. and 44 centers overseas.

Of the 1,278 candidates taking the examination in U. S. centers, 616 (48.2%) obtained scores of 75% or better and received ECFMG standard certificates and 341 (26.7%) obtained scores of 70 to 74% and received ECFMG temporary certificates. None of these candidates failed the ECFMG English test, but three were listed as "questionable pass."

Of the 494 candidates taking the examination in the 44 overseas examination centers, 153 (31%) obtained scores of 75% or better and received ECFMG standard certificates and 110 (22.3%) obtained scores of 70 to 74% and received ECFMG temporary certificates. There were in this group 22 failures and 23 listed as "questionable pass" in the ECFMG English test. There was one foreign center in which 3 out of 5 candidates had serious difficulty with the English test and two foreign centers in which approximately 5 out of 10 candidates had serious difficulty with the English test.

Future Examinations

The fourth American medical qualification examination is scheduled for Sept. 22, 1959. Applications and credentials must be in the hands of the ECFMG, 1710 Orrington Ave., Evanston, Ill., no later than June 22, 1959. Examination centers will be activated in the cities listed in the table.

The examinations for 1960 are scheduled as follows: March 16, 1960 (with deadline for application Dec. 16, 1959), and Sept. 21, 1960 (with deadline for application June 21, 1960).

Conclusions

The Educational Council for Foreign Medical Graduates is growing rapidly. The number of candidates given the American medical qualification examination has risen rapidly from 298 on March 25, 1958, and 844 on Sept. 23, 1958, to 1,772 on Feb. 17, 1959. Over 1,000 candidates are already signed up for the examination on Sept. 22, 1959.

Largely because of the language difficulties, the issuance of temporary two-year certificates to those attaining scores of 70 to 74% in the examination has been found necessary. The qualifying examination is now being offered in 34 United States cities and in 52 foreign cities twice each year. Additional centers are in the process of being organized.

U. S. and Canadian Centers

California, Los Angeles
California, San Francisco
Colorado, Denver
Connecticut, New Haven
District of Columbia, Washington
Florida, Miami
Georgia, Emory
Illinois, Chicago
Kansas, Kansas City
Kentucky, Louisville
Maryland, Baltimore
Massachusetts, Boston
Michigan, Ann Arbor
Minnesota, Minneapolis
Missouri, St. Louis
New Jersey, Jersey City
New York, Brooklyn
New York, Buffalo
New York, New York City
New York, Syracuse
North Carolina, Durham
North Dakota, Grand Forks
Ohio, Cincinnati
Ohio, Cleveland
Pennsylvania, Philadelphia
Pennsylvania, Pittsburgh
Tennessee, Nashville
Texas, Houston
Virginia, Richmond
Washington, Seattle
Wisconsin, Milwaukee
Hawaii, Honolulu
Puerto Rico, San Juan
Canada, Montreal

Foreign Centers

Argentina, Buenos Aires
Aruba
Brazil, Rio de Janeiro
Chile, Santiago
Colombia, Cali
Cuba, Havana
Ecuador, Quito
Haiti, Port-au-Prince
Mexico, D.F., Mexico City
Nassau
Nicaragua, Managua
Panama, Panama City
Peru, Lima
El Salvador, San Salvador
B. C. Colony, Hong Kong
India, Bombay
India, Calcutta
India, Madras
India, New Delhi
Japan, Tokyo
Korea, Seoul
Philippines, Manila
Taiwan, Taipei
Thailand, Bangkok
Cyprus, Nicosia
Iraq, Baghdad
Iran, Tehran
Israel, Tel Aviv
Lebanon, Beirut
Pakistan, Dacca
Pakistan, Karachi
Pakistan, Lahore
Syria, Damascus
Turkey, Ankara
Turkey, Istanbul
Austria, Vienna
Belgium, Brussels
England, London
France, Paris
Germany, Bonn
Germany, Frankfurt
Germany, Munich
Greece, Athens
Iceland, Reykjavik
Italy, Rome
Netherlands, The Hague
Portugal, Lisbon
Spain, Madrid
Switzerland, Bern
Egypt, Cairo
New Zealand, Wellington
Yugoslavia, Belgrade

American hospitals accepting as interns or assistant residents the foreign medical graduates who hold either standard or temporary certificates should feel safe in assuming that these candidates are bona fide physicians who have had a minimum of 18 years of formal training, at least 4 of the years in a recognized medical school, and that their knowledge of medicine and their command of English are ample to enable them to serve effectively as interns or assistant residents.

1710 Orrington Ave.

LIPID STUDIES IN HEALTH AND DISEASE

PRELIMINARY REPORT OF THE RESULTS OF LIPID DETERMINATIONS IN A GROUP OF NORMAL MALE OFFICERS AND PATIENTS WITH VASCULAR DISEASES

Brig. Gen. Thomas W. Mattingly, Lieut. Col. Loren F. Parmley Jr., (MC), U. S. Army
Emmett L. Durrum, M.D., Elizabeth R. B. Smith, Ph.D.
and
Marion R. Hyatt, B.S., Washington, D. C.

In an effort to determine the diagnostic and prognostic value of certain laboratory data in atherosclerosis, values obtained from 294 normal healthy male officers were compared with values obtained from 205 patients with myocardial infarction, 101 with angina, 77 with arteriosclerosis obliterans, 99 with hypertensive cardiovascular disease, and 100 under observation for cardiovascular disease. The data concerned total serum cholesterol levels and two lipoprotein fractions. Significant differences between groups were found, but variations from person to person within groups were too great to permit identification and prediction of atherosclerosis in individuals. The serum lipid values of 10 normal persons who subsequently showed severe cardiovascular symptoms (fatal in four cases) were not consistently high. The serum cholesterol level was as informative as data from the more elaborate procedures. When it is high in a patient, the physician should look for other evidence of premature vascular disease.

Recognition of the increasing importance of atherosclerosis as a major cause of death and disability has stimulated extensive investigation in this field during the past decade. Atherosclerosis is no longer regarded as the inevitable result of age or "wearing out" of the arteries but is now considered a disease entity. Autopsy studies suggest that almost all North American adult males have some coronary artery atherosclerosis and that this process can begin early in adult life and may often exist in an occult form for years before recognizable clinical manifestations appear.[1]

Cholesterol is the chief chemical constituent in the atheromatous plaque, the pathological hallmark of atherosclerosis. The pathogenesis or mechanism of atherogenesis is not known, and the question has been a subject of widespread speculation and international research. Among the many causes and predisposing factors considered have been heredity; type of vascular construction; injury to the vascular wall by infection, trauma, stress, and increased vascular tone and intravascular pressure; faulty enzymatic activity in lipid metabolism; or a basic abnormality in lipid metabolism based on faulty diet.

The frequent finding of a high concentration of serum cholesterol in persons with atherosclerosis and the production of experimental atherosclerosis in laboratory animals by feeding them high cholesterol-lipid diets have suggested that there is an etiological relationship between a defect in lipid metabolism and human atherosclerosis. Epidemiologic studies of sample populations have statistically suggested that an association exists between high-fat diets and higher serum cholesterol levels and a high incidence of atherosclerosis. These combined observations have provided an indirect method of study which only furnishes information about groups of persons and may or may not apply to a particular person whom we may wish to evaluate in terms of absence or presence of atherosclerosis or susceptibility to this condition.

One important phase now under investigation, evaluation, and debate is the relationship of cholesterol and other lipids to atherosclerosis and the part they play as possible etiological or predisposing factors, indicators of existing disease, or predictors in persons who may be susceptible to this disease. The potentialities of a method or a blood measurement for the early identification of persons with atherosclerosis or a predisposition to this disease attracted the attention of military physicians whose primary responsibility is selecting the physically fit and maintaining the health of military personnel.

The present study was initiated at Walter Reed Army Hospital early in 1951 with the assistance of the department of pharmacology of the Walter Reed Army Institute of Research. Its aim was to evaluate the reliability of the various methods of lipid determinations in identifying and predicting atherosclerosis, especially coronary atherosclerosis. Measurements giving promise of value at that time were (1) serum cholesterol concentration,[2] (2) serum

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From the Cardiology Service, Walter Reed Army Hospital (General Mattingly and Colonel Parmley) and the Department of Pharmacology, Walter Reed Army Institute of Research (Drs. Durrum and Smith and Miss Hyatt). General Mattingly is now at the Washington Hospital Center, Washington, D. C. Colonel Parmley is now at the Letterman Army Hospital, San Francisco. Dr. Durrum is now at the Stanford University School of Medicine. Dr. Smith is now with the National Institute of Mental Health, National Institutes of Health, Bethesda, Md.

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normal subjects, but the increases were not as great as among those with definite clinical coronary disease. The individual variations in each group were great and the differences between the values of the normal and the diseased persons were small, thus preventing efficient application of the clinical theory of identification and prediction of atherosclerosis.

In this study, the elevation of the serum cholesterol level was greater and more distinctive in the group with proved atherosclerosis than were the S_f 12-20 and S_f 20-100 values for lipoproteins. Preliminary follow-up findings in the normal group indicate a better predictive value of cholesterol determinations as indicated by the subsequent development or recognition of atherosclerotic processes in those previously regarded as normal. Periodic repeated evaluation and long-term clinical follow-up studies of this normal group and similar groups by other investigators are necessary before the true predictive value of lipid determinations in atherosclerosis is established.

The serum cholesterol level measurement provides as much information as other more elaborate and expensive chemical and physical procedures for the measurement of lipoprotein levels, and serious consideration should be given to its addition to periodic health examinations to aid in identifying disturbances in lipid metabolism which may indicate a predisposition to or the presence of atherosclerosis. The presence of an elevated cholesterol value in an otherwise normal young adult male should encourage a search to uncover further evidence of premature vascular disease.

3638 Cumberland St., N.W. (12) (General Mattingly).

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APPENDICITIS AND DIABETES.—When acidosis begins to be severe the diabetic patient develops pain and tenderness in the abdomen which closely simulates peritonitis secondary to appendicitis. To operate upon a patient for appendicitis, only to find that one is dealing with diabetic acidosis, is a very unfortunate error and may be disastrous. An awareness of the symptoms and findings of diabetic acidosis together with a few simple laboratory tests will usually make a proper diagnosis possible. One should bear in mind, however, that a diabetic patient in acidosis can develop appendicitis, and making the differential diagnosis in this case may be a real challenge to the surgeon. In both disease processes abdominal pain, nausea, vomiting, abdominal tenderness, elevated temperature and leukocytosis may occur. Usually the symptom of pain occurs first in appendicitis and the symptom of vomiting occurs first in diabetic acidosis. Another helpful differential point is that in appendicitis the physical signs may be more localized, and in diabetic acidosis they may be more generalized throughout the abdomen. Localized rigidity is unlikely in diabetic acidosis.—D. H. Wagner, M.D., The Preparation and Care of Diabetic Patients Requiring Surgery, *Surgical Clinics of North America*, February, 1959.

SPECIAL ARTICLES

The following two papers report studies done at the request of the Committee on Amphetamine Drugs and Athletes of the Board of Trustees of the American Medical Association. These studies represent a part of the Committee's efforts to help determine the effects of such drugs on athletic performance and the extent, if any, of their use in sports. Other findings and the recommendations of the Committee have been submitted to the Board of Trustees and will subsequently be reported to the profession and to the public.

AMPHETAMINE SULFATE AND ATHLETIC PERFORMANCE

I. OBJECTIVE EFFECTS

Gene M. Smith, Ph.D.
and
Henry K. Beecher, M.D., Boston

The study presented here was designed to answer the question of whether or not amphetamine sulfate ("pep pills") improves athletic performance in trained athletes.

Preliminary Considerations

Controlling Factors in Planning.—We knew at the outset that many variables might influence the effect of amphetamine on athletic performance: dose level; time after medication at which event was performed; whether the subject was rested, slightly fatigued, or severely fatigued; type of athletic event performed (brief intense effort versus prolonged, less intense effort, or event where performance is largely dependent on form versus event where performance is largely dependent on strength); whether the subject performed the event competing with the clock or competing with another athlete; whether the athlete knew he was receiving a drug (and his expectations concerning its effect); whether or not the subject was in top form; mood; and motivation.

An initial exploratory phase of the investigation yielded data which did not demonstrate conclusively that amphetamine either did or did not help athletic performance, on the average. However, both the measured performance data and the subjective data obtained by interviewing the athletes indicated that at least some athletes could obtain consistent and repeatable improvements in performance by taking amphetamine sulfate in the dose of 14 mg. per 70 kg. of body weight two to three hours before a race.

This suggestion of an improved performance encouraged us to undertake the second, and much more extensive, phase of the investigation. The present report will deal primarily with the second phase. Six separate experiments comprised this phase of the investigation. Almost 800 measured performances of swimmers, runners, and weight throwers were obtained. Since each experiment was different from the others in important characteristics, each will be described separately and the results reported separately.

Subjects.—In the first and last experiments swimmers were used as subjects. In the second, third, and fourth runners were used. In the fifth weight throwers and shot putters were used. Except for the subjects in experiment four, all were members of the varsity or freshman teams of large Eastern colleges and universities. All college athletes were tested either during or immediately after their athletic season and so were in competitive physical condition. No experimental trials were run on days when the athletes were competing with athletes from other colleges.

Medicaments.—All subjects in all six experiments received, orally, both a placebo and 14 mg. of amphetamine per 70 kg. of body weight, administered on the double-blind basis. The other necessary controls [1] were also used. As will be shown below, the subjects in five of the experiments received one or more other medicaments (50 and 100 mg. of secobarbital and 7 and 21 mg. of amphetamine) in addition to a placebo and 14 mg. of amphetamine per 70 kg. of body weight. On the first day of the first experiment the medicaments were given in elixir form. Some of the subjects objected to the taste of the elixir. Therefore on the remaining 11 days of that experiment and in all subsequent experiments the medicaments were taken in capsule form. The weight of each capsule was accurate to 0.5 mg. In all experiments except the third, the

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From the Anaesthesia Laboratory of the Harvard Medical School at the Massachusetts General Hospital.

subjects were given an envelope containing the medicament a day or two before each experimental session. The time at which each capsule was to be taken was written on the envelope containing the capsule. On arriving for the experimental session the subject was asked to inform the experimenter if he had taken the medicament as much as five minutes early or late. In all studies the subjects began their experimental session from two to three hours after taking amphetamine. The time interval was shorter (15, 55, and 60 minutes) for those who took secobarbital. These and other details concerning each of the six experiments are presented below. In describing the various experiments an explanation will be given as to why the experiments were carried out as they were.

Each day before taking the medicament the subject completed a questionnaire giving information about the following items: last night's rest, today's energy level, physical impairments, and degree of eagerness for today's workout. Each day the subject completed an 81-item adjective check list describing his mood and physical condition. The check list was completed once before taking medicament and twice afterward. In addition, after his performance, each subject completed a questionnaire designed to help him evaluate his performance. The results obtained with the questionnaires and check lists will be presented in two subsequent papers.

Method

Experiment 1.—Fifteen collegiate swimmers served as subjects in the first experiment. Each man swam his event twice on each of 12 consecutive experimental days. The second swim began 15 minutes after the beginning of the first and therefore was performed under conditions of fatigue. Three men swam the 100-yd. butterfly, three the 100-yd. free style, three the 200-yd. free style, three the 200-yd. breast stroke, and three the 200-yd. back stroke.

On 4 of the 12 days a subject received 14 mg. of amphetamine per 70 kg. of body weight. On four he received placebo, and on four he received 100 mg. of secobarbital per 70 kg. of body weight. The exploratory phase of our investigation had indicated that a few subjects were able consistently to distinguish the effect of 7 mg. of amphetamine per 70 kg. of body weight from those of a placebo. Since the subjects knew the investigation was one dealing with "pep pills," the possibility existed that a "suggestion effect" was produced whenever the subject noticed any unusual feelings or sensations. In other words, it was possible for the performance to be better on "amphetamine days" than on "placebo days" not because the "pep pills" invigorated the athlete or heightened his motivation but simply because he noticed unusual feelings and sensations and assumed this meant he had been given the "pep pill," expected help from it, and so performed better than usual. The reason for using secobarbital with amphetamine and placebo in five of the six experiments of the second phase of the investigation was to prevent the subject from correctly assuming he had received amphetamine whenever he noticed any unusual feelings or sensations. It was also used in an attempt to clarify the question of whether an amphetamine improvement, when it occurs, is due largely to changes in attitude and psychic state. The added advantage of the two drugs chosen is that earlier work[2] had indicated that both have euphoric power while one is a so-called stimulant and the other a depressant. (The subjects were told only that "pep pills" and placebos were being used.)

The design of this experiment required that each subject receive amphetamine on four days, placebo on four, and secobarbital on four. An attempt was made to control for order-effects which could be produced by progressive changes in level of performance, progressive changes in attitude toward the experiment, and other factors. To control for such effects, the drug sequence was set up so that any given subject would receive one dose of amphetamine, one of placebo, and one of secobarbital during each of the four quarters of his 12 trials. There are six possible ways of ordering three drugs: 123, 132, 231, 213, 312, 321. Each subject was assigned four such sequences, each involving three drugs, giving a total of 12 medicaments. The experimenter collecting the data did not know which drug any particular subject had on any given day. This same general procedure was followed to control for order-effects in the remaining studies.

The 12 experimental days were grouped into 6 competitive days (where the three men in a group raced against each other) and 6 individual days (where each man swam alone, racing against the clock). There were two competitive days and two individual days for each of the three types of medication—amphetamine, secobarbital, and placebo. On one of the individual amphetamine days and on one of the competitive amphetamine days the subject took amphetamine two hours before the beginning of the first swim. On the two remaining amphetamine days he took the medicament three hours before beginning the first swim.

Preliminary studies led us to believe the peak subjective and behavioral effects of 14 mg. of amphetamine occurred between two and three hours after medication, whereas that for 100 mg. of secobarbital was approximately one hour. Consequently the experiment was designed so that the interval between the taking of the active medicament and the beginning of the first swim would be two hours for half of the amphetamine sessions, three hours for the other half, and 55 minutes for all the secobarbital sessions.

On all days a subject took two capsules. The first was taken at either two hours or three hours before the first swim. (Twice under each of the three drugs it was two hours; twice under each it was three.) The second capsule was taken 55 minutes before the first swim on all 12 occasions. On amphetamine days the first capsule contained the amphetamine and the second was a placebo. On placebo days both were placebos. On secobarbital days the first capsule was a placebo and the second contained secobarbital. On placebo days and on secobarbital days the first capsule (which was always a placebo) was taken two hours before the first swim on half of the occasions and three hours before it on the other half.

Each experimental day was organized around six events which were strictly timed. 1. At a specified time (either two or three hours before the first swim) the subject took his first capsule. 2. Fifty-five minutes before the first swim he took his second capsule. 3. Twenty-five minutes before his first swim the subject reported to one of the experimenters and told him if he had failed to take either of the two capsules within five minutes of the time specified. (In no instance did the interval between reported medication time and beginning of first swim deviate from the scheduled interval by more than 15 minutes. The decision was made, without knowledge of drug orderer, not to discard the data which were slightly—5 to 15 minutes—off schedule.) 4. Fifteen minutes later the subject began his warm-up swim, which was timed by a second experimenter to last three to five minutes. 5. The swimmer rested approximately five minutes after warming up and began his first swim exactly 10 minutes after the beginning of the warm-up. 6. Fifteen minutes (plus or minus one minute) after the beginning of his first swim the subject began his second swim.

Each swimmer was timed by two or more clocks. Always one was an ordinary stop watch and one was a 0.01-second electric clock which started automatically at the sound of the gun. (The electric timing device is an invention of Mr. David Collander of Massachusetts Institute of Technology.) One or more additional stop watches were used on approximately half of the races.

Because the electric timing device eliminated the reaction time of starting the stop watch, the electric times were longer (an average of 0.18 second) than the manual times. In coordinating the manual and electric data this difference was taken into account. All time information for each race was examined (without knowledge of which medicament had been given) and the median was accepted as accurate. This same procedure was used in experiment 6. In experiments 2, 3, and 4 only one clock (a manual stop watch) was used for each runner.

The subjects were scheduled in staggered fashion, the first reporting at 4 p. m. and the last reporting at 5:30 p. m. There were a few deviations from this plan due to scheduling problems. However no subject ever reported earlier than 3 or later than 6 p. m.

The cooperation on the part of the subjects in this experiment was exceptionally good. They usually reported for the experiment about five minutes before they were scheduled to arrive. In the total 180 sessions no more than five began late, and in these instances the lateness was usually between 5 and 15 minutes.

Experiment 2.—Nine collegiate track men served as subjects in experiment 2. Three ran 600 yd., three ran 1,000 yd., and three ran one mile. Each man ran these distances only once each experimental day. The sessions were separated by at least one day. Experimental sessions were never carried out either on the day of a meet with another school or on the day preceding such a meet. The runs occurred on an indoor track with a cinder surface. The men ran in competitive groups of three, except on two occasions when scheduling problems reduced the size of a group to two. All races occurred between 4:30 and 5:15 p. m.

The experimental design called for nine runs from each subject, three sessions in which the subject would be medicated with 14 mg. of amphetamine per 70 kg. of body weight, three with 50 mg. of secobarbital per 70 kg., and three with placebo. Due to illness one subject completed only three runs and so contributed only one run under each of the three medication conditions. Following the procedure outlined in experiment 1, the secobarbital was taken one hour before running and the amphetamine was taken two hours before running.

In this experiment and in the subsequent ones the barbiturate dosage was only half that used in experiment 1. As mentioned above, the barbiturate was used to prevent the subject from correctly assuming he had received amphetamine whenever he thought he perceived drug-effects. The 100-mg. dosage, used in experiment 1, was so potent that subjects occasionally said such things as the following to the experimenter: "I feel sort of dopey. I think I got a sleeping pill today." To reduce the obviousness of its effects, the secobarbital dosage was changed to 50 mg. per 70 kg. in the present experiment and in the three subsequent ones where secobarbital was used.

Analysis of the data of experiment 2 was complicated by the fact that on the day of session 8 the track was filled with holes. Session 8 occurred after the track season was over and the baseball players had begun practicing in the indoor track "cage." Due to an oversight the track had not been rolled before the beginning of this session, and baseball practice had left it in bad condition. The amount of impairment produced by the poor track conditions was assessed by obtaining for each subject the difference between his time on session 8 and his mean time on the other two sessions when he ran under the same type of medication as that given him on session 8. In all instances the time for session 8 was greater. The average difference for the group was 12.6 seconds. The average percent difference was 6.7. The "t" value for the mean difference of 6.7 was 3.41, which is beyond the 0.02 level of significance. The results of experiment 2 are reported both including and excluding the data obtained on session 8.

Experiment 3.—In experiment 3 eight collegiate track men ran once on each of six experimental days. They ran in competitive groups of two or three on an outdoor wooden track. Three men ran a mile. Three ran 600 yd. Two ran 440 yd. The subjects were given 14 mg. of amphetamine per 70 kg. on two occasions, with 50 mg. of secobarbital per 70 kg. on two and with placebo on two. Each day the subject took two casules. The first capsule was taken two hours and the second one hour before running. On amphetamine days the first capsule contained amphetamine and the second was a placebo. On the secobarbital days the second capsule contained the active agent. Both capsules were inactive on the placebo days. All runs took place between 2 and 4:30 p.m.

The original design of this experiment called for 12 runs from each subject. However only six were completed by the time the wooden track was removed for spring baseball practice. Our aim had been to have an interval of at least one day between experimental sessions. However in about one-third of the cases this was not possible because of scheduling problems. The cooperation of these subjects was poorer than that of the other groups studied. Their races were frequently 10 to 20 minutes off schedule. There were numerous cancellations and changes of schedule. Interpretation of the results was further complicated by the fact that the subjects ran on an outdoor track during winter. The temperature and wind velocity varied considerably and influenced running times.

Experiment 4.—The nine subjects participating in experiment 4 were marathon runners preparing for the Boston Athletic Association Marathon and other long-distance races. They were tested during the two months preceding the marathon, which occurred on April 20.

These subjects were different from those in the other five experiments primarily by virtue of age. The age range was 22 to 41 years, with a median of 33 years. Four of these men had attended college. All of them were experienced runners. Most had been running for several years. Seven had won Amateur Athletic Union–sponsored long-distance races on one or more occasions. The other two had been among the first five to finish in one or more such races.

The original design called for 12 runs from each man, three times after the placebo had been given, three times with 50 mg. of secobarbital per 70 kg., twice with 7 mg. of amphetamine per 70 kg., and twice with 14 mg. and twice with 21 mg. amphetamine per 70 kg. Because of weather difficulties and injuries only three of the runners completed all 12 runs. Two completed 8, one 10, one 9, one 6, and one 5 runs.

Any given subject in this experiment ran the same distance and the same course each day. However, the various subjects ran different courses. The shortest course was approximately 4.5 miles and the longest approximately 12.7 miles. Each subject timed himself.

Each day a subject took two capsules. He took the first capsule two hours and the second 15 minutes before beginning the race. As in the preceding experiments amphetamine medicaments were put in the first capsule, secobarbital in the second, and placebos in both. The various subjects ran for different lengths of time, depending on the length of their course and their running speed. The shortest running time occurred on a 4.7-mile course (24 minutes and 10.5 seconds) and the longest running time occurred on the 12.7-mile course (92 minutes and 20 seconds). The time interval between taking the second capsule and starting the race was shorter (15 minutes) in this experiment than in the others. This was done primarily for reasons of safety. (Several of the subjects drove automobiles to the starting point of their courses. We did not want subjects who were unprepared for the possible effects of mental clouding and sedation to begin experiencing these effects while driving to their courses.)

Before beginning the experiment a subject was told the reason for the study and was told that extraneous factors such as weather conditions and his physical condition could influence the results of his time-trials. He was asked to control as well as possible all such factors and, in particular, not to take the medicament when the weather was bad. The subject filled in a questionnaire after each race, indicating all factors which might have influenced his running time that day.

In all experiments we pointed out to the subject that his role was that of experimenter as well as subject. An attempt was made to inspire all subjects to be meticulously careful and honest in carrying out their responsibilities. An especially strong effort was made in this respect in the present experiment because all measured performances of the marathon runners were carried out in the absence of the experimenter. The subject was given 12 packages, each containing the medicament and performance-analysis materials for one trial. He was asked to run the same course every session, not to run when the weather was bad, and not to run when his physical condition was impaired to an extent which might affect his running time. In the entire 82 runs of this experiment only 3 were discarded because of violation of these controls. One session was discarded because subject 4 altered his course on that day. (Snow began to fall after the subject had begun his run. In an attempt to compensate for this, he shortened his course.) On another occasion subject 5 (whose 6.8-mile course was an approximately straight line between his home and his place of work) discovered on beginning his race that he had to face a 30-mile per hour headwind the entire distance. On this occasion his time was 49.30 (49 minutes and 30 seconds). In his remaining 11 trials there was a 2.75-minute range (from 40:30 to 43:15). The wind caused his time to fall 6.25 minutes outside that range. On the third discarded occasion a still different runner (subject 7) ran an experimental session the day after he had competed in a 30-km. (18.64-mile) Amateur Athletic Union race. He began the race reporting sore feet as a physical impairment. He ran his 4.7-mile course that day in 33 minutes and 52 seconds. As in the case of the man running against the headwind, the time just reported was grossly out of line with the remaining ones. On this man's remaining eight trials his best time was 24:10.5 and his worst was 27:15 (a range of 3 minutes and 4.5 seconds). His "sore feet" time of 33:52 was over six minutes outside the range of his other eight races.

Experiment 5.—Thirteen collegiate weight-throwers and shot-putters served as subjects in experiment 5. Nine threw the 35-lb. weight. Four put the 16-lb. shot. All were members of varsity or freshmen teams. (Although shot-putters are sometimes called weight-throwers, the present report will distinguish between the two groups by calling the nine who threw the 35-lb. weight weight-throwers and calling the four who put the 15-lb. shot shot-putters.) All experimental sessions were carried out in a heated indoor track cage.

TABLE 1.—*Comparative Effects, in Experiment 1, of Amphetamine Sulfate, Secobarbital, and Placebo on Performance Times of Fifteen Subjects Swimming Under Rested and Fatigued Conditions**

		First Swim, Rested Condition†							Second Swim, Fatigued Condition†						
		Time, Sec.				$\frac{\overline{P}-\overline{A}}{\overline{P}}$, %		$\frac{\overline{P}-\overline{S}}{\overline{P}}$, %	Time, Sec.				$\frac{\overline{P}-\overline{A}}{\overline{P}}$, %		$\frac{\overline{P}-\overline{S}}{\overline{P}}$, %
Swimming Style	Subject No.	$\overline{P}$	$\overline{A}$	$\overline{S}$	$\overline{P}-\overline{A}$		$\overline{P}-\overline{S}$		$\overline{P}$	$\overline{A}$	$\overline{S}$	$\overline{P}-\overline{A}$		$\overline{P}-\overline{S}$	
Free style, 100-yd.															
	1.......	57.46	56.92	57.94	+0.54	+0.94	−0.48	−0.84	58.77	58.66	60.07	+0.11	+ .19	−1.30	−2.21
	2.......	58.56	57.89	60.07	+0.67	+1.14	−1.51	−2.58	60.01	58.97	60.90	+1.04	+1.73	−0.89	−1.48
	3.......	56.38	55.81	56.91	+0.57	+1.01	−0.53	−0.94	59.14	57.95	58.10	+1.19	+2.01	+1.04	+1.76
Butterfly, 100-yd.															
	4.......	65.49	64.44	69.50	+1.05	+1.60	−4.01	−6.12	66.53	65.01	70.56	+1.52	+2.28	−4.03	−6.06
	5.......	69.87	69.82	71.35	+0.05	+0.07	−1.48	−2.12	72.33	71.24	74.34	+1.09	+1.51	−2.01	−2.78
	6.......	77.52	73.82	76.18	+3.70	+4.77	+1.34	+1.73	89.32	88.16	91.61	+1.16	+1.30	−2.29	−2.56
Free style, 200-yd.															
	7.......	136.77	136.74	143.13	+0.03	+0.02	−6.36	−4.65	143.84	145.86	148.83	−2.02	−1.40	−4.99	−3.47
	8.......	139.62	138.76	144.81	+0.86	+0.62	−5.19	−3.72	146.22	143.51	147.28	+2.71	+1.85	−1.06	−0.72
	9.......	134.25	132.31	136.47	+1.94	+1.45	−2.22	−1.65	142.67	137.76	144.59	+4.91	+3.44	−1.92	−1.35
Back stroke, 200-yd.															
	10.......	148.52	145.59	152.73	+2.93	+1.97	−4.21	−2.83	152.78	150.89	153.60	+1.89	+1.24	−0.82	−0.54
	11.......	164.24	162.52	166.48	+1.72	+1.05	−2.24	−1.36	169.61	170.59	171.68	−0.98	−0.58	−2.07	−1.22
	12.......	166.65	166.85	169.06	−0.20	−0.12	−2.41	−1.45	177.05	180.08	176.11	−3.03	−1.71	+0.94	+0.53
Breast stroke, 200-yd.															
	13.......	160.84	159.39	161.62	+1.45	+0.90	−0.78	−0.48	162.05	165.52	164.15	−3.47	−2.14	−2.10	−1.30
	14.......	176.95	174.10	177.07	+2.85	+1.61	−0.12	−0.07	179.87	179.38	180.45	+0.49	+0.27	−0.58	−0.32
	15.......	177.82	177.16	180.28	+0.66	+0.37	−2.46	−1.38	183.51	185.72	184.60	−2.21	−1.20	−1.09	−0.59

* Dosages were 11 mg. of amphetamine sulfate per 70 kg. of body weight and 100 mg. of secobarbital per 70 kg. of body weight.

† $\overline{P}$= mean placebo time for each subject. $\overline{A}$=mean amphetamine time for each subject. $\overline{S}$=mean secobarbital time for each subject. $\overline{P}-\overline{A}$ indicates change in performance under amphetamine: + indicates improvement: — indicates impairment. The per cent change scores listed under $\frac{\overline{P}-\overline{A}}{\overline{P}}$, % were obtained with the formula $(\frac{\overline{P}-\overline{A}}{\overline{P}})$ (100).

Both weight-throwers and shot-putters threw 15 to 25 times each day. (The subjects were told that their first three throws would be considered warm-up throws and would not be counted. In analyzing the data the decision was made to eliminate the first five rather than the first three because the fourth and fifth throws were in general below the mean of the remaining throws. This decision was made without knowledge of the drug administered to a given subject on a given day.) Chalk lines were drawn every 5 ft. within the throwing range. An experimenter was stationed about 30 ft. from the point at which the weight was expected to fall. When it landed, the experimenter estimated its distance by relating the identation made in the ground at the point of contact to the system of chalk lines. (Time limitations prevented tape measurement.) After each throw the subject walked to the point where his throw had landed and then gave his own distance-estimate to the experimenter. In general the discrepancies between estimates made by the experimenter and those made by subjects were less than one foot. The average for all subjects for all sessions was 0.41 ft.

The design called for 12 sessions, four with 14 mg. of amphetamine per 70 kg. of body weight, four with 50 mg. secobarbital per 70 kg., and four with placebo. Only 7 of the 13 men completed all 12 sessions. Two were there for 10, one for 6, one for 5, and two for 4 sessions. The two subjects contributing only four sessions (subjects 7 and 8) (tables 8 and 9) were 35-lb. weight-throwers who were somewhat uninterested in the experiment. In general their cooperation was poor. Five of their eight sessions were ones on which they either reported late or failed to take their medicament on time. The subject contributing five sessions (subject 9) was a freshman who changed his style after the third session, adding another body turn. The data contributed by the three men just mentioned are suspect as well as sparse. Consequently the weight-throwing analyses have been done both including and excluding these three subjects. As in the earlier experiments the subjects took two capsules each day, one or both of which contained placebos. Amphetamine was taken two hours and secobarbital one hour before the session began.

Although no subject contributed more than 12 sessions the study lasted a total of 15 days because of missed sessions and make-ups. The experimental sessions began at 4:30 p.m. on each of the first nine days of the study. Because of unavailability of space they began at 7:30 p.m. on the final six days. During the latter sessions the subjects were instructed to take their first capsule at 5:45 p.m., eat dinner at 6:15, take their second capsule at 6:45, and report for the experiment at 7:30. (The effect of amphetamine on performance was found to be somewhat similar in the afternoon (mean improvement = 4.84%) and in the evening (mean improvement = 6.29%.)

Table 2.–*Statistical Evaluations, for Experiment 1, of the Comparative Effects of Amphetamine and Placebo on Swimming Times of Fifteen Swimmers Under Rested and Fatigued Conditions*

		First Swim, Rested Condition*						Second Swim, Fatigued Condition*					
		Average Magnitude of Effect			Average Percent of Effect			Average Magnitude of Effect			Average Percent of Effect		
No. of Swimmers	Distance of Swim Yd.	$\overline{P}-\overline{A}$	"t"	p	$\frac{\overline{P}-\overline{A}}{P}$, %	"t"	p	$\overline{P}-\overline{A}$	"t"	p	$\frac{\overline{P}-\overline{A}}{P}$, %	"t"	p
6	100	+1.02	5.24	0.01	+1.50	5.03	0.01	+1.10	2.04	0.10	+1.59	2.38	0.10
9	200	−0.19	0.20	NS	−0.03	0.04	NS	+1.36	3.63	0.01	+0.87	3.65	0.01
15	Combined Groups	+ .29	0.50	NS	+0.59	1.36	0.20	+1.26	4.17	0.001	+1.16	3.82	0.01

* $\overline{P}-\overline{A}$=mean difference for the group of $\overline{P}-\overline{A}$ scores presented in table 1.

$\frac{\overline{P}-\overline{A}}{\overline{P}}$, %=mean difference for the group of $\frac{\overline{P}-\overline{A}}{\overline{P}}$, % scores presented in table 1.

t="t" test value for correlated means.

p=two-tailed probability value.

NS=not significant at or beyond the 0.20 level using a two-tailed test.

Experiment 6.–Sixteen swimmers served in this experiment. Thirteen of them had previously been subjects in experiment 1. Three were new. There were several ways in which this experiment differed from the first one. There were 6 sessions rather than 12. On three days a subject received 14 mg. of amphetamine; on three he received a placebo. No secobarbital was used. The drug order was random with the two restrictions that (1) no subject would receive the same medicament three times consecutively and (2) no subject would receive the same medicament on either the first and second or the fifth and sixth sessions. All capsules were taken two hours before the race. With a few exceptions an interval of one day intervened between adjacent experimental sessions. Experiment 1, on the other hand, had been run on consecutive days. Experiment 6 was begun two days after the final competitive meet of the year. Experiment 1 had been carried out in the early part of the season. In the present experiment each subject swam only once each day rather than twice. This was done to encourage the subjects to give an "all out" effort. They did not have to save themselves for a second race.

The major difference between experiments 1 and 6 was that in the sixth we tried to guarantee maximum effort from each subject on all swims. (We had asked for maximum effort in all experiments. However, in experiments 1, 2, and 3 we compared the experimental times with those achieved in meets with other schools and found the experimental times to be slower for most subjects than the meet times. Interestingly, this was not the case with the weight-throwers and shot-putters of experiment 5. The longest experimental throws were, in general, as far as the longest meet throws.) To achieve an experimental situation which would stimulate maximum effort and approximate the psychological atmosphere of a competition with another college the following steps were taken. First, the subjects were called together for a meeting before the experiment began. At this meeting it was explained that the sole purpose of the experiment was to test the pep pills under conditions which simulated the school competition situation. We explained that our investigation could not be considered complete until we knew whether the pep pills were effective under conditions of maximum motivation and 100% effort. (No information was given concerning the results of the previous experiments.)

Second, the race times each swimmer had achieved in the final three to five competition swims of the season were collected from the coach and the median of these times was computed for each subject. At the preexperimental meeting each subject was given his median competition time and was told that this was the goal he was to attempt to match in the experimental swims. The subjects were told that each man whose median experimental time equaled or beat his median competition time would be treated to a steak dinner, where he could order anything he wanted up to $7.50. Furthermore, they were told the whole group would win the dinner if as many as half of the men won.

Third, the swimmers were asked to cheer on their teammates just as they customarily did during competition with other schools. Throughout the experiment the swimmers did this. Indeed, several observers remarked that on some experimental sessions the enthusiasm and excitement were greater than that seen at meets with other schools.

Several of the swimmers made their "steak" times on both the first and second experimental days. This raised the possibility that certain of the subjects might win their steaks on the first four swims and then relax on the last two. To avoid this a new element was added to the experiment at the beginning of the third day. The subjects were told that any swimmer who made his "steak" time on five out of six occasions would be treated to an extra steak dinner on some evening subsequent to the first.

In general, the attempt to obtain maximum performance was successful. Nine of the 16 swimmers broke their "steak" times on at least three out of six occasions. Two broke their lifetime records. Five more came within 0.3 second of their lifetime records. Forty-seven of the 93 swims reached the "steak" time criterion. One might wonder why the "steak" time incentive was so effective with these subjects. This incentive was chosen because we discovered in talking with the subjects after the first experiment that winning a steak dinner appeared to have symbolic significance for the boys. On various past occasions certain ones of them had been given steak dinner incentives by their coaches. In these instances the steak dinner had meant much more than its monetary equivalent. Our experimental "steak" time arrangement was selected in an effort to tap this previously established symbolic reward system.

Fifteen of the 16 swimmers completed their six scheduled swims. One (subject 13) became ill and was able to complete only three (table 11). Another (subject 14) had a series of misfortunes. He missed four regularly scheduled sessions, which he subsequently made up. Once he caught the "flu." Once he received a third degree burn on his arm. In addition to missing four regular sessions he performed four of his swims under handicapped conditions. Once he swam still feeling weak from the "flu." Twice he swam with a bandage covering the burn on his arm and reported that the water caused pain at the point of the burn. On still another occasion he received an allergy shot before swimming and reported that this had produced swelling, stiffness, and pain in his arm. The range between his best and worst time was 11.2 seconds. This is more than five times as great as the mean range for the remaining 15 subjects. The swimming analyses reported in the next section were performed both including and excluding these two swimmers.

TABLE 3.—*Statistical Evaluations of the Comparative Effects in Experiment 1, of Placebo and Amphetamine Sulfate on Swimming Times of Men Swimming Individually and in Competition with Each Other Under Rested and Fatigued Conditions.**

		Swimming Individually									Swimming in Competition								
Distance of Swim, Yd.	No. of Subjects	2 Hr. After Medication			3 Hr. After Medication			2 and 3 Hr. Combined			2 Hr. After Medication			3 Hr. After Medication			2 and 3 Hr. Combined		
First Swim, Effect, Av. Magnitude		Md	"t"	p	Md	"t"	p	Md	"t"	p	Md	"t"	p	Md	"t"	p	Md	"t"	p
100	6	+0.76	1.51	0.20	+1.71	2.63	0.05	+1.24	2.19	0.10	+0.81	1.53	0.20	+1.10	1.62	0.20	+0.96	1.65	0.20
200	9	+2.41	3.28	0.02	+1.49	1.78	0.20	+1.95	2.63	0.05	+0.88	1.26	NS	+0.65	0.68	NS	+0.77	1.21	NS
100 and 200	15	+1.75	3.38	0.01	+1.57	2.87	0.02	+1.67	3.38	0.01	+0.86	1.87	0.10	+0.83	1.35	0.20	+0.84	1.96	0.10
First Swim, Effect, Av. %																			
100	6	+1.06	1.48	0.20	+2.55	3.12	0.05	+1.81	2.46	0.10	+1.20	1.69	0.20	+1.53	1.73	0.20	+1.37	1.84	0.20
200	9	+1.48	3.50	0.01	+0.89	1.66	0.20	+1.19	2.63	0.05	+0.64	1.39	NS	+0.43	0.65	NS	+0.54	1.25	NS
100 and 200	15	+1.32	3.54	0.01	+1.56	3.18	0.01	+1.44	3.66	0.01	+0.86	2.23	0.05	+0.87	1.63	0.20	+0.87	2.20	0.05
Second Swim, Effect, Av. Magnitude																			
100	6	+1.23	2.45	0.10	+1.52	6.85	0.001	+1.38	4.53	0.01	—0.02	0.06	NS	+1.34	2.99	0.05	+0.66	4.01	0.02
200	9	+1.01	0.61	NS	+2.57	2.01	0.10	+1.79	1.27	NS	—1.11	1.59	0.20	—3.22	3.16	0.20	—2.17	3.23	0.02
100 and 200	15	+1.10	1.10	NS	+2.15	2.81	0.02	+1.62	1.94	0.10	—0.68	1.45	0.20	—1.40	1.62	0.20	—1.04	1.91	0.10
Second Swim, Effect, Av. %																			
100	6	+1.74	2.43	0.10	+2.27	6.24	0.01	+2.01	4.59	0.01	+0.12	0.22	NS	+1.88	2.97	0.05	+1.01	3.71	0.02
200	9	+0.75	0.69	NS	+1.72	2.01	0.10	+1.20	1.27	NS	—0.66	1.41	0.20	—1.96	3.07	0.02	—1.31	3.16	0.02
100 and 200	15	+1.14	1.62	0.20	+1.94	3.69	0.01	+1.52	2.60	0.05	—0.35	0.98	NS	—0.42	0.63	NS	—0.30	0.96	NS

* The 72 Md values (mean difference values) give a more detailed breakdown of information presented in table 2. Average magnitude and average per cent differences between amphetamine time and placebo time for the three groups (100-yd., 200-yd., and combine) are presented separately for individual and competition conditions. Within each of those conditions there is a further breakdown for the 2-hr. and 3-hr. intervals. For the most detailed breakdown, each Md score is based on only one amphetamine and one placebo time for each subject.

Four of the 16 subjects swam the 200-yd. breast stroke, 3 swam the 200-yd. back stroke, 3 the 200-yd. free style, 3 the 100-yd. butterfly, and 3 the 100-yd. free style. All races occurred between 4:30 and 6:30 p.m. Eleven of the subjects swam in groups of two or three. Five swam alone. All 16 subjects were combined into a single group in the analyses because examination of the comparative swimming times under the effects of amphetamine and placebo indicated that the 5 men who swam alone were not affected differently by amphetamine than were the 11 who swam in groups. Presumably this was because the subjects swam with maximum or near maximum motivation whether swimming alone or in groups. The results of this experiment are reported in table 11.

As in experiment 1, the cooperation of subjects in this experiment was remarkable. In the entire 96 occasions, subjects reported more than five minutes late only three times. On two occasions subjects reported taking medicaments late; one subject took one of his medicaments 10 minutes late and another was 15 minutes late in taking one of his.

Data Collected in Phase I.—Our investigation of the effects of pep pills on athletes was carried out in two phases. The first provided a broad exploratory coverage of the problem. We studied several different dose levels using various time intervals between medication and performance. One dose level (7 mg. per 70 kg.) was studied in a sufficient number of subjects (20) to warrant inclusion in this report. Those data are presented in the section on results, after presentation of the more substantial and extensive results obtained in phase 2.

The work done in the first phase was exploratory. Different subjects were studied differently. In presenting the results obtained with each subject a tabular summary of the more important methodological details will be given.

RESULTS

Experiment 1.—Experiment 1 was the most extensive and intricate of the six experiments described in the preceding section. It provided 360 measured performances by 100-yd. and 200-yd. swimmers. The results obtained with each of the 15 swimmers in the first experiment are presented in table 1. Each subject swam four times under each of three drug conditions: placebo, amphetamine (14 mg. per 70 kg. of body weight), and secobarbital (100 mg. per 70 kg.). Each subject's mean time for the first (rested condition) swim on the four placebo sessions and his corresponding mean time for amphetamine and secobarbital sessions are shown; times for the second (fatigued) swims under influence of placebo, amphetamine, and secobarbital, respectively, are also shown. (The results of the statistical analyses of the data presented in table 1 are shown in tables 2 and 4.)

Table 1 shows the difference between each subject's mean placebo time and his mean amphetamine time for the first swim. Of the 15 subjects, all but one have plus scores, indicating that they swam faster under influence of amphetamine than of placebo. The mean improvement for the 15 subjects taken as a group was 1.26 seconds. As shown in table 2, this improvement is very significant, statistically. When evaluated with the "t" test for correlated means it yields a "t" value of 4.17, which is beyond the 0.001 level of significance using a two-tailed test.

Column 5 of table 1 presents the comparative performance under influence of amphetamine and placebo on the first swim in a different way. Here the difference between a subject's mean placebo score and his mean amphetamine score is expressed as a percentage of his mean placebo score. Table 2 shows that the 15 swimmers taken as a group obtained a mean improvement of 1.16% under amphetamine. This average improvement yields a "t" of 3.82, which is beyond the 0.01 level of significance.

Column 6 of table 1 shows the comparative swimming time under influence of placebo and secobarbital. Fourteen of the 15 subjects were impaired by secobarbital. The group had an average impairment of 2.18 seconds. The corresponding percentage of impairment for the group was 1.9%. The "t" values for these mean differences are shown in table 4.

Column 11 of table 1 presents the comparative effects of amphetamine and placebo on the second swim. The performance of 10 of the 15 subjects was improved by amphetamine. However, the average

TABLE 4.—*Statistical Evaluations in Experiment 1, of Comparative Effects of Placebo and Secobarbital on Swimming Times of Men Swimming Individually and in Competition with Each Other Under Rested and Fatigued Conditions Fifty-five Minutes after Medication.**

Distance of Swim, Yd.	No. of Subjects	Swimming Individually			Swimming in Competition			Combined		
		Md	"t"	p	Md	"t"	p	Md	"t"	p
First Swim, Effect, Av. Magnitude										
100	6	−1.41	1.15	NS	−0.81	1.82	0.20	−1.11	1.55	0.20
200	9	−2.87	3.21	0.02	−2.90	4.90	0.01	−2.89	4.30	0.01
Combined	15	−2.28	3.15	0.01	−2.07	4.37	0.001	−2.18	4.10	0.01
First Swim, Effect, Av. %										
100	6	−2.30	1.26	NS	−1.32	2.06	0.10	−1.81	1.72	0.20
200	9	−1.99	3.05	0.02	−1.92	4.54	0.01	−1.95	3.92	0.01
Combined	15	−2.12	2.68	0.02	−1.68	4.72	0.001	−1.90	3.83	0.01
Second Swim, Av. Magnitude										
100	6	−2.20	2.21	0.10	−0.96	1.32	NS	−1.58	2.30	0.10
200	9	−0.97	1.11	NS	−2.07	3.71	0.01	−1.52	2.84	0.05
Combined	15	−1.46	2.22	0.05	−1.62	3.61	0.01	−1.55	3.80	0.01
Second Swim, Av. %										
100	6	−3.23	2.15	0.10	−1.22	1.17	NS	−2.22	2.17	0.10
200	9	−0.67	1.18	NS	−1.44	3.85	0.01	−1.00	2.73	0.05
Combined	15	−1.70	2.29	0.05	−1.35	2.98	0.01	−1.49	3.16	0.01

* Symbols are defined in earlier tables. The Md scores are based on the $\overline{P}$-$\overline{S}$ and $\frac{\overline{P}\text{-}\overline{S}}{\overline{P}}$, % scores presented in table 1.

improvement for the group was only 0.29 second. The corresponding average percentage improvement was 0.59% (table 2).

Column 13 shows that 13 of the 15 subjects were impaired by secobarbital on the second swim. The average impairment for the group was 1.55 seconds ("t"=3.80; $p<0.01$). The corresponding impairment was 1.49% ("t"=3.16; $p<0.01$) (table 4).

Table 1 presents the results of the statistical comparisons of placebo versus amphetamine (14 mg. per 70 kg.) for each of three groups: the six 100-yd. men, the nine 200-yd. men, and the 15 swimmers combined. The results shown in table 2 were arrived at using the "t" test for correlated means. The "t" test values and their associated two-tailed probability values are reported both for magnitude of difference (mean placebo minus mean amphetamine) and for percentage of difference (mean placebo minus mean amphetamine/mean placebo). In these comparisons there is no breakdown for the competitive versus individual conditions or for the 2-hour versus 3-hour conditions. (Such a breakdown is given, however, in table 3).

TABLE 5.—*Comparative Effects of Amphetamine Sulfate, Secobarbital, and Placebo on Performance Times of Five Groups of Subjects Swimming Under Rested and Fatigued Conditions.*[*]

	First Swim, Rested Condition			
	$\overline{\bar{P}\text{-}\bar{A}}$	$\frac{\overline{\bar{P}\text{-}\bar{A}}}{\bar{P}}$, %	$\overline{\bar{P}\text{-}\bar{S}}$	$\frac{\overline{\bar{P}\text{-}\bar{S}}}{\bar{P}}$, %
100-yd. free style swimmers (n=3)....	+1.60	+2.15	−1 38	−2.17
100-yd. butterfly (n=3)................	+0.59	+1.03	−0.84	−1.45
200-yd. free style (n=3)...............	+0.94	+0.70	−4.59	−3.34
200-yd. back stroke (n=3)............	+1.65	+0.96	−1.12	−0.64
200-yd. breast stroke (n=3)..........	+1.49	+0.97	−2.96	−1.88
	Second Swim, Fatigued Condition			
100-yd. free style (n=3)...............	+1.25	+1.70	−2.77	−3.80
100-yd. butterfly (n=3)................	+0.78	+1.31	−0.37	−0.64
200-yd. free style (n=3)...............	+1.86	+1.30	−2.65	−1.85
200-yd. back stroke (n=3)............	−1.74	−1.02	−1.26	−0.74
200-yd. breast stroke (n=3)..........	−0.71	−0.35	−0.65	−0.41

[*] Symbols defined in table 2; scores based on those in table 1.

As shown in table 2, amphetamine produced statistically significant improvement for both the 100-yd. swimmers and the 200-yd. swimmers during the first swim (rested condition) but produced significant improvement for only the 100-yd. men on the second swim (fatigued condition).

Table 3 shows the comparative effects of placebo and amphetamine (14 mg./70 kg.) on swimming times when the subjects swam alone (racing against the clock) and when they swam in competition (racing against each other). This table presents a further breakdown (within the individual condition and within the competition condition) of the effects of amphetamine when taken two hours before the first swim and when taken three hours before the first swim. The amphetamine versus placebo comparisons in table 3 give some indication that the amphetamine effects may have been slightly greater at three hours than at two hours after medication, especially on the second swim comparisons. However this tendency is not consistent enough to be more than suggestive. Consequently the description of results in the next two paragraphs will be limited to the comparisons combining the data obtained at the two time points.

For the first swim (rested condition) amphetamine produced improvement in both 100-yd. and 200-yd. men, both when the men swam individually and when they swam in competition. Swimming individually, the mean improvement scores were 1.24 seconds., 1.95 seconds, and 1.67 seconds for the 100-yd., 200-yd., and combined groups respectively. All three improvements were beyond the 0.10 level of significance. The corresponding improvement scores were 1.81%, 1.19%, and 1.44% (all beyond the 0.10 level of significance). When the subjects swam competitively the amphetamine improvement was not as great as that found when the subjects swam individually. The 10-yd. men obtained an improvement of 0.96 seconds. The 200-yd. men improved 0.77 seconds. The combined group improved 0.84 seconds. The corresponding improvement scores were 1.37%, 0.54%, and 0.87%. (See table 3 for "t" values and significance levels.) Although the 15 subjects obtained a greater mean difference between amphetamine and placebo when swimming individually than when swimming competitively, this difference did not reach the 0.20 level of significance.

On the second swim (fatigued condition) there was an interesting difference between the 100-yd. and 200-yd. swimmers under the competition condition. Whereas the 100-yd. men swam 0.66 seconds faster under the influence of amphetamine than under placebo ("t"=4.01; $p<0.02$) the 200-yd. men swam 2.17 seconds slower under influence of amphetamine ("t"=3.23; $p<0.02$). On the other hand, both groups of swimmers obtained an amphetamine improvement when swimming individually, although the improvement for the 200-yd. men was slight.

Table 4 presents information concerning the comparative effects of secobarbital and placebo, under rested and fatigued conditions, with a breakdown for individual and competitive conditions. On the first swim the 200-yd. men showed about the same impairment when swimming individually (2.87 seconds and 1.99%) as when swimming competitively (2.90 seconds and 1.92%). The 100-yd. men showed more impairment when swimming individually (1.41 seconds and 2.30%) than when swimming competitively (0.81 seconds and 1.32%).

On the second swim the 100-yd. and 200-yd. men showed an interesting difference in secobarbital effect. The 100-yd. men were impaired more than twice as much when swimming individually than when swimming competitively (2.20 seconds as opposed to 0.96 seconds), whereas the 200-yd. men showed just the reverse. They were impaired 0.97 seconds when swimming individually and 2.07 seconds when swimming competitively. Both with respect to magnitude and percent effect, table 4 shows that on the second swim 100-yd. men were *impaired to a statistically significant extent* when swimming individually (but not when swimming competitively) while the 200-yd. men were impaired significantly when swimming competitively but not when swimming individually.

The 15 swimmers comprised five groups of three men each: 100-yd. free style, 100-yd. butterfly, 200-yd. free style, 200-yd. back stroke, and 200-yd. breast stroke. Table 5 shows that all five groups swam faster under influence of amphetamine than under placebo on the first swim. On the second swim the two groups of 100-yd. men and the 200-yd. free style group swam faster under influence of amphetamine than placebo but the 200-yd. breast stroke and 200-yd. back stroke groups swam slower under influence of amphetamine than placebo. On both first and second swims all five groups showed impairment under secobarbital (table 5).

Subject 9 increased the variability of the group greatly. Consequently the "t" values are low in spite of the fact that eight of the nine subjects improved during use of amphetamine.

As mentioned before, session 8 was carried out under atypical conditions. The statistical analyses were performed both including and excluding that session. The right half of table 6 presents the results obtained excluding session 8. The average improvement under amphetamine was 6.37 seconds ("t"=2.23; $p<0.10$). The corresponding improvement was 3.17% ("t"=2.46; $p<0.05$).

Both the analyses including session 8 and those excluding it show that the subjects ran slightly faster under secobarbital (50 mg. per 70 kg.) than under placebo. However, none of those comparisons reached the 0.20 level of significance.

Experiment 3.—Five of the eight subjects in experiment 3 ran faster under influence of amphetamine than placebo; three ran slower. Considered as a group, the subjects had an average amphetamine time which was 1.08 seconds faster than that for placebo. The corresponding percentage difference was 0.89%. However, neither of these comparisons reached the 0.20 level of significance. We believe this lack of significance was due partly to uncontrolled weather variables. (As mentioned before, this experiment was carried out during the winter on an outdoor track. The temperature varied from 25 to 69 F. The wind velocity varied from 8 to 23 miles per hour. To assess the effect of variations in temperature on running time, each subject's score on the warmest amphetamine day was subtracted from his score on the coldest amphetamine day; then the same was done for his two placebo days and two secobarbital days. The mean of these three difference scores was then obtained. The resulting score showed the effect of temperature, with the drug-effect controlled. Seven of the eight subjects ran faster on the warm days than on the cold days. The mean difference for the group was 2.89 seconds. A comparable analysis was performed to evaluate the

TABLE 6.—*Comparative Effects in Experiment 2, of Amphetamine Sulfate, Secobarbital, and Placebo on Performance Times of Nine Runners.**

Distance Run	Subject No.	All Sessions							Session 8 Excluded						
		Time in Seconds				$\frac{\overline{P}-\overline{A}}{\overline{P}}$, %		$\frac{\overline{P}-\overline{S}}{\overline{P}}$, %	Time in Seconds				$\frac{\overline{P}-\overline{A}}{\overline{P}}$, %		$\frac{\overline{P}-\overline{S}}{\overline{P}}$, %
		$\overline{P}$	$\overline{A}$	$\overline{S}$	$\overline{P}-\overline{A}$		$\overline{P}-\overline{S}$		$\overline{P}$	$\overline{A}$	$\overline{S}$	$\overline{P}-\overline{A}$		$\overline{P}-\overline{S}$	
600 Yd.	1	84.03	83.43	81.80	+0.60	+0.71	+2.23	+2.65	82.85	83.43	81.80	−0.58	−0.70	+1.05	+1.27
	2	86.03	85.47	87.00	+0.56	+0.65	−0.97	−1.13	85.45	85.47	87.00	−0.02	−0.02	−1.55	−1.81
	3	90.07	87.93	89.60	+2.14	+2.38	+0.47	+0.52	90.07	87.93	89.10	+2.14	+2.38	+0.97	+1.08
1,000 Yd.	4	159.40	154.60	156.90	+4.80	+3.01	+2.50	+1.57	159.40	153.55	156.90	+5.85	+3.67	+2.50	+1.57
	5	182.53	176.40	180.15	+6.13	+3.36	+2.38	+1.30	182.53	167.80	180.15	+14.73	+8.07	+2.38	+1.30
	6	175.03	166.08	166.07	+8.95	+5.11	+8.96	+5.12	175.03	160.30	166.07	+14.73	+8.42	+8.96	+5.12
1 mile	7	296.80	280.00	287.10	+16.80	+5.66	+9.70	+3.27	296.80	280.00	287.10	+16.80	+5.66	+9.70	+3.27
	8	315.46	300.53	314.47	+14.93	+4.73	+0.99	+0.31	312.23	300.53	314.47	+11.70	+3.75	−2.24	−0.72
	9	291.90	308.67	306.43	−16.77	−5.75	−14.53	−4.98	291.90	299.90	306.43	−8.00	−2.74	−14.53	−4.98
Mean difference for nine runners					+4.24	+2.21	+1.30	+0.96				+6.37	+3.17	+0.80	+0.68
"t" values					1.30	1.91	0.56	1.00				2.23	2.46	0.34	0.70
Two-tailed probability values					NS	0.10	NS	NS				0.10	0.05	NS	NS

* Symbols defined in earlier tables.

Experiment 2.—Table 6 presents the results obtained with the nine runners who performed on an indoor track. The mean performance times under the influence of placebo, amphetamine (14 mg. per 70 kg.), and secobarbital (50 mg. per 70 kg.) are shown in columns 1, 2, and 3 respectively. Column 4 shows the difference between each subject's mean placebo time and his mean amphetamine time. Column 5 expresses that difference as a percent of the mean placebo time. Columns 6 and 7 show the corresponding magnitude and per cent comparisons for placebo versus secobarbital. The results of the statistical evaluations of these scores appear at the bottom of the table.

Column 4 shows that eight of the nine runners performed faster under influence of amphetamine than under placebo. The mean difference for the amphetamine-placebo scores is 4.24 seconds. The mean difference is 2.21%. These two mean differences yield "t" values of 1.30 and 1.91 respectively.

effect of variations in wind velocity. Seven of the eight subjects ran faster on the less windy days. The mean difference for the group was 2.20 seconds.)

Experiment 4.—Table 7 presents the results obtained with the nine marathon runners performing under placebo, secobarbital (50 mg. per 70 kg.), and three different dosages of amphetamine (7, 14, and 21 mg. per 70 kg. of body weight). Data obtained under the three dosage levels of amphetamine were combined in the comparisons shown in table 7. Six of the subjects ran faster under influence of amphetamine than placebo; three ran slower. Considered as a group the subjects ran an average of 24.12 seconds faster under influence of amphetamine than placebo ("t"=2.13; $p<0.10$). The mean difference was 1.07% ("t"=1.72; $p<0.20$).

As in experiment 3, the performances of experiment 4 occurred out of doors during late winter. Weather variable added to the variability of the date and tended to reduce the statistical significance of the improvement shown under amphetamine by the group.

TABLE 7.—*Comparative Effects, in Experiment 4, of Amphetamine Secobarbital, and Placebo on Performance of Nine Marathon Runners.*[*]

Subject No.	Distance	Time in Minutes and Seconds			Comparative Times in Seconds			
	Mi.	$\bar{P}$	$\bar{A}$[†]	$\bar{S}$	$\bar{P}$-$\bar{A}$	$\frac{\bar{P}-\bar{A}}{\bar{P}}$, %	$\bar{P}$-$\bar{S}$	$\frac{\bar{P}-\bar{S}}{\bar{P}}$, %
1	7.0	48:39.00	48:00.00	49:07.50	+39.00	+1.34	− 28.50	−0.98
2	5.8	32:39.35	32:45.30	33:47.00	− 5.95	−0.30	− 67.65	−3.45
3	12.7	87:35.67	87:18.00	92:05.00	+17.67	+0.34	−269.33	−5.12
4	6.0	31:20.00	31:42.00	31:20.67	−22.00	−1.17	− 0.67	−0.04
5	6.8	42:20.00	41:18.00	41:38.33	+62.00	+2.44	+ 41.67	+1.64
6	4.5	26:04.00	26:28.00	27:02.00	−24.00	−1.53	− 58.00	−3.71
7	4.7	26:44.00	25:45.63	26:20.50	+58.37	+3.64	+ 23.50	+1.47
8	7.25	43:21.00	42:39.58	42:54.33	+41.42	+1.59	+ 26.67	+1.03
9	4.7	25:40.00	24:49.43	25:31.65	+50.57	+3.28	+ 5.35	+0.35
Mean difference for nine runners					+21.12	+1.07	− 36.33	−0.98
"t" values					2.13	1.72	1.15	1.17
Two-tailed probability values					0.10	0.20	NS	NS

[*] Dosages of 7, 14, and 21 mg. of amphetamine per 70 kg. of body weight and 50 mg. of secobarbital per 70 kg. of body weight were given.

[†] The three amphetamine dose levels were combined in obtaining the $\bar{A}$ values.

There were reasons for questioning the validity of the data contributed by all three of the subjects who ran faster under influence of placebo than amphetamine; however, the decision was made to retain their data. Subject 6 had only one placebo session. Subject 4 indicated on his performance analyses that 9 of his 12 performances (75%) were not "all-out" efforts. The corresponding average for the remaining eight subjects was 15%. All subjects had been asked to make each effort an "all-out" one. In general, subject 4 did not appear to grasp the concept of a controlled experiment. He was the subject who altered his course on one occasion. The result of one of his races was recorded in the wrong place. Other indications of failure to meet the requirements of the experiment were also found in his data.

Both the fastest time and slowest time for subject 2 occurred under the 21 mg. per 70 kg. dose of amphetamine. That slow amphetamine race occurred the day after the subject had "run himself into the ground" in a hard 15-mile race wearing 10 lb. of clothing. The runner's written comments made after the race follow:

> First I would like to say that I was wearing 10 pounds of clothing (my boots alone weighing 3½ lb.) in my 15 miles work out last night in which 'I ran myself into the ground.' This was the hardest work-out I'd had in months. Needless to say, I was very tired today. I feel therefore that had I done 6 miles (not too hard) instead of 15 miles last night, a time equal to or better than my best time of 33:25 would not have been unreasonable. I was thinking in terms of a 35 minutes-something, work-out before my first medication! And yet, after a ½ hr. sleep between capsules and just after my second, my mood and outlook changed substantially, so I estimated 34:40. However, while running my first 100 yards I wished I'd estimated even something around 36:00 minutes—my legs just wouldn't go and I felt very tired. But since I feel it a responsibility to do my very best in order to make these experiments worth while, I pushed myself hard and worked my arms harder than usual. I soon established a better racing pace but it was just one hell of a grind *all* the way. My time was 34:08,7! I was amazed that I could force myself so much today. My legs felt light and loose afterwards and I enjoyed a 2 mile jog. I have had a tingling and chilled sensation of my body since the run. As a summary, I feel this was the most substantial mental and physical change I have ever experienced in such a short period of time.

To compare different dose levels, it was planned that each subject would run twice under each of three dose levels of amphetamine. Due to illness and adverse weather, only three subjects completed all sessions. Of the sessions run, three were discarded as mentioned under "method." Four of the nine subjects made only one run under the 7-mg. dose, five made only one run under the 14-mg. dose, and five made only one run under the 21-mg. dose. Furthermore, 10 of the sessions retained were performed under conditions of moderate physical impairment or weather adversity. These considerations require cautious interpretation of the data. The subjects ran faster on the average under 14-mg. doses of amphetamine than under 7-mg. doses, and still faster under the 21-mg. dose, but the factors mentioned cast doubt on the accuracy of the differences observed in results after use of the three dose levels. The subjects ran 0.06% slower, 0.30% faster, and 2.54% faster under the 7-mg., 14-mg., and 21-mg. doses, respectively, than after taking the placebo. The first two comparisons were not significant at the 0.20 level. The third was significant beyond the 0.10 level. Because of the uncontrolled factors mentioned and because half the subjects had a given dose level only once, the comparisons at the three separate dose levels were less stable than the comparison combining all three. The standard error for the combined analysis was 0.62%, while those for the comparisons based on 7-mg., 14-mg., and 21-mg. dose performances considered separately were 0.89%, 0.83%, and 1.21% respectively.

Experiments 2, 3, and 4 Combined.—In all three experiments using runners as subjects, the groups ran faster under the influence of amphetamine than under placebo. The man improvement scores were 2.21%, 0.89%, and 1.07% for experiments 2, 3, and 4 respectively. This is slightly higher than the mean improvement found with the swimmers of experiment 1. In spite of this the statistical evaluations of the data obtained with the runners were in no case as convincing as those based on the data obtained with the swimmers. This was due in part to factors already mentioned which increased the instability of the data.

The data are stabilized somewhat by combining the three experiments. (The standard error for the analysis combining the percentage scores of experiments 2, 3, and 4 is only 0.60%; those for experiments 2, 3, and 4, considered individually, are 1.34%, 1.23%, and 0.62% respectively.) Since the various subjects ran various distances (440 yards to 12.7 miles) the combined analysis was performed on the percent scores ($\overline{P}$-$\overline{A}$/$\overline{P}$%) only. Combining the three groups yields a mean improvement under amphetamine of 1.40%. The "t" value for this combined analysis is 2.42, which almost reaches the 0.02 level of significance. A further combined analysis was carried out excluding session 8 in experiment 2. This produced a mean difference of 1.74% ("t"=2.75; p<0.02).

TABLE 8.—*Comparative Effects, in Experiment 5, of Amphetamine Sulfate, Secobarbital, and Placebo on Maximum Distances Thrown by Nine 35-lb Weight-Throwers and Four 16-lb Shot-Putters.**

Subject, No.†	Distance, Ft.† $\overline{P}$	$\overline{A}$	$\overline{S}$	$\overline{A-P}$	$\frac{\overline{A-P}}{\overline{P}}$, %	$\overline{S-P}$	$\frac{\overline{S-P}}{\overline{P}}$, %	$\overline{A-S}$
WT 1	46.9	50.1	49.6	+3.2	+6.82	+2.7	+5.76	+0.5
WT 2	51.9	54.8	53.1	+2.9	+5.59	+1.2	+2.31	+1.7
WT 3	41.3	45.0	42.8	+3.7	+8.96	+1.5	+3.63	+2.2
WT 4	45.3	49.6	47.1	+4.3	+9.49	+1.8	+3.97	+2.5
WT 5	59.8	60.5	59.8	+0.7	+1.17	0.0	0.00	+0.7
WT 6	49.1	49.3	48.6	+0.2	+0.41	−0.5	−1.02	+0.7
SP 1	48.6	51.8	47.8	+3.2	+6.58	−0.8	−1.65	+4.0
SP 2	40.0	40.4	39.0	+0.4	+1.00	−1.0	−2.50	+1.4
SP 3	34.7	35.0	34.1	+0.3	+0.86	−0.6	−1.73	+0.9
SP 4	42.0	44.0	42.6	+2.0	+4.76	+0.6	+1.43	+1.4
WT 7§	47.5	45.5	45.0	−2.0	−4.21	−2.5	−5.26	+0.5
WT 8§	61.0	59.0	60.0	−2.0	−3.28	−1.0	−1.64	−1.0
WT 9§	48.0	49.0	43.8	+1.0	+2.08	−4.2	−8.75	+5.2

sulfate per 70 kg. of body weight
g. of body weight was given.
rked WT; 16-lb. shot-putters are
g tables.

§ Weight throwers whose data we judged to be unreliable, before determining which drugs were given on which days (see text).

Experiment 5.—The nine 35-lb. weight-throwers and the four 16-lb. shot-putters contributed data which have been evaluated in terms of maximum distances thrown and mean distances thrown under each medication.

TABLE 9.—*Comparative Effects, in Experiment 5, of Amphetamine Sulfate, Secobarbital, and Placebo on Mean Distances Thrown by Nine 35-lb Weight-Throwers and Four 16-lb Shot-Putters.*

Subject, No.*	Distance in Feet† $\overline{P}$	$\overline{A}$	$\overline{S}$	$\overline{A-P}$	$\frac{\overline{A-P}}{\overline{P}}$, %	$\overline{S-P}$	$\frac{\overline{S-P}}{\overline{P}}$, %	$\overline{A-S}$
WT 1	42.91	42.98	44.93	+0.07	+0.16	+2.02	+4.71	−1.95
WT 2	47.99	49.71	49.11	+1.72	+3.58	+1.12	+2.33	+0.60
WT 3	39.20	42.44	40.12	+3.24	+8.27	+0.92	+2.35	+2.32
WT 4	42.41	46.44	44.90	+4.03	+9.50	+2.49	+5.87	+1.54
WT 5	55.69	57.19	56.16	+1.50	+2.69	+0.47	+ .84	+1.03
WT 6	45.87	47.23	46.47	+1.36	+2.96	+0.60	+1.31	+0.76
SP 1	45.63	49.93	45.84	+4.30	+9.42	+0.21	+0.46	+4.09
SP 2	38.33	39.44	35.28	+1.11	+2.90	−3.05	−7.96	+4.16
SP 3	33.28	33.53	32.80	+ .25	+ .75	−0.48	−1.44	+0.73
SP 4	40.06	41.53	40.58	+1.47	+3.67	+0.52	+1.30	+0.95
WT 7‡	44.14	43.16	41.50	− .98	−2.22	−2.64	−5.98	+1.66
WT 8‡	59.02	55.00	57.10	−4.02	−6.81	−1.92	−3.25	−2.10
WT 9‡	42.99	45.67	39.72	+2.68	+6.23	−3.27	−7.61	+5.95

* 35-lb weight-throwers are marked WT; 16-lb shot-putters are marked SP.

† Symbols are defined in earlier tables

‡ *Weight-throwers whose data we judged to be unreliable, before determining which drugs were given on which days (see text).*

Each man threw approximately 15 to 25 times each day. Each day a subject's maximum and mean throws were determined. The mean of each subject's maximum throws under each drug condition appears in table 8. Column 1 presents the mean of each subject's maximum throws for his placebo days. Columns 2 and 3 show the means of the maximum throws for the amphetamine and secobarbital days respectively. Column 4 shows the comparison of each subject's maximum score under influence of amphetamine with his maximum score under placebo. Column 5 expresses the amphetamine—placebo difference as a percentage of the placebo score.

Table 9 presents similar information concerning the effects of amphetamine and secobarbital on the mean distances thrown. Table 10 presents the results of statistical analyses of the data reported in tables 8 and 9.

Under "Method" we mentioned that the weight-throwing analyses were carried out both including and excluding the results obtained with three subjects whose data were sparse and in our judgment unreliable. Table 10 gives the results of four separate evaluations of each type of score: the first is based on the data of the six 35-lb. weight-throwers who contributed six or more sessions; the second is based on the data of the four 16-lb. shot-putters; the third combines these two groups; the fourth is based on the data of all 13 subjects, including the three subjects whose data are questionable.

Table 10 shows that all amphetamine *versus* placebo analyses based on the total group of 13 are significant beyond the 0.10 level. The ana exclude the three subjects mentioned above yield even clearer demonstrations of an amphetamine effect. (All are significant beyond the 0.01 level.)

With regard to the maximum distance scores, the six weight-throwers and four shot-putters obtained average improvement scores of 2.50 ft. and 1.48 ft. respectively, under influence of amphetamine. The average improvement for the group of 10 was 2.09 ft. This group effect yields a "t" of 5.84, which is significant beyond the 0.001 level. The corresponding improvement scores for these three groups were 5.41%, 3.30%, and 4.56%.

The results obtained with the evaluation of mean distance scores are very similar to those obtained when the comparisons were made on the basis of maximum distance scores. Under amphetamine (14 mg. per 70 kg.) the 6 weight-throwers obtained an average improvement of 1.99 ft., the 4 shot-putters improved 1.78 ft., and the total group of 10 improved 1.91 ft. This average improvement of 1.91 ft. yields a "t" of 4.10, which is beyond the 0.01 level of significance. The corresponding average improvement scores are 4.53%, 4.19%, and 4.39% for the weight-throwers, shot-putters and combined groups respectively. Both with respect to maximum scores and mean scores the six 35-lb. weight-throwers obtained statistically significant improvement ($p<0.10$) under influence of secobarbital. The four 16-lb. shot-putters obtained impairment. The total group of 10 showed improvement for both maximum and mean scores but neither comparison reached the 0.20 level of significance.

Experiment 6.—Table 11 shows the average swimming time of each of the 16 swimmers under influence amphetamine and placebo. It also shows each subject's goal ("steak time"), the difference between his mean time under placebo and his mean time under amphetemine, and the percent improvement or impairment produced by amphetamine. Eleven of the 16 subjects swam faster under influence of amphetamine than placebo. Table 12 pre[illegible] average magnitude and average percentage [illegible] for the 6 100-yd. swimmers, for the 10 200-yd. swimmers, and for the 16 swimmers taken as a group. It also presents the results of the statistical evaluations of these comparisons. The average amphetamine improvement for the 6 100-yd. swimmers was 0.56 second; that for the 10 200 yd. swimmers was 0.68 second; that for the 16 men considered as a single group was 0.63 second. The total group "t" yields a mean difference of 0.63 second, of 2.14 which is significant beyond the 0.05 level. The mean improvement scores for the 6 100-yd. men, the 10 200-yd. men and the total group of 16 were 0.95%, 0.45%, and 0.64% respectively. The "t" value for the 0.64% improvement shown by the total group was 2.49, with a corresponding two-tailed probability values of <0.10, beyond the 0.05 level.

As mentioned before, two of the swimmers contributed data which we judged (before the drugs administered were known in the given cases) to be less reliable than that of the other 14 subjects. Eliminating these two subjects raised the mean improvement from 0.63 second to 0.71 second and changed the "t" value from 2.14 to 2.13. The mean improvement was raised from 0.64% to 0.72% and the "t" value changed from 2.49 to 2.50.

Table 13 presents the average magnitude and average percentage effects for each of the five subgroups of subjects. One man in each subgroup swam faster under the influence of placebo than of amphetamine. However each of the five subgroups, considered as a unit, swam faster under influence of amphetamine.

The sixth session was one in which the motivation and attitude of certain of the subjects may have been different from that of earlier sessions. Whether the whole group won steak dinners depended on the final performance of two of the subjects. On the other hand, five of the subjects had reached the "steak time" criterion on each of their first five performances and came to the sixth session knowing they had won their two steak dinners and could win no more. A final analysis was performed eliminating session 6. The results were very similar to those

TABLE 10.—*Statistical Evaluations, in Experiment 5, of the Comparative Effects of Amphetamine Sulfate, Secobarbital and Placebo on Performance of Nine 35-lb. Weight-Throwers and Four 16-lb. Shot-Putters. Comparisons Are Given Both in Terms of Average Magnitude of Effect and Average Per Cent of Effect for Both Maximum Scores and Mean Scores.*

	Average Magnitude of Effect*									Average Per Cent of Effect*					
	$\bar{A}$ vs. $\bar{P}$	"t"	p	$\bar{S}$ vs. $\bar{P}$	"t"	p	$\bar{A}$ vs. $\bar{S}$	"t"	p	$\bar{A}$ vs. $\bar{P}$	"t"	p	S vs. P	"t"	p
Comparisons Based on Maximum Throws															
Six weight-throwers	+2.50	3.68	0.02	+1.12	2.32	0.10	+1.38	3.91	0.02	+5.41	3.14	0.02	+2.44	2.34	0.10
Four shot-putters	+1.48	2.13	0.20	—0.45	—1.25	NS	+1.93	2.75	0.10	+3.30	2.33	0.20	—1.11	—1.28	NS
Six weight-throwers plus Four shot-putters	+2.09	5.84	0.001	+0.49	1.22	NS	+1.60	4.72	0.01	+4.56	4.14	0.01	+1.02	1.14	NS
All 13 subjects	+1.38	2.43	0.05	—0.22	—0.43	NS	+1.59	3.55	0.01	+3.09	2.57	0.05	—0.42	—0.38	NS
Comparisons Based on Mean Throws															
Six weight-throwers	+1.99	3.42	0.02	+1.27	3.84	0.02	+ .72	1.21	NS	+4.53	3.09	0.05	+2.90	3.60	0.02
Four shot-putters	+1.78	2.03	0.20	—0.70	—0.86	NS	+2.48	2.62	0.10	+4.19	2.26	0.20	—1.91	—0.91	NS
Six weight-throwers plus Four shot-putters	+1.91	4.10	0.01	+0.48	1.01	NS	+1.42	2.52	0.05	+4.39	4.05	0.01	+0.98	0.82	NS
All 13 subjects	+1.29	2.10	0.10	—0.23	—0.44	NS	+1.52	2.42	0.05	+3.16	2.46	0.05	—0.54	—0.44	NS

* $\bar{A}$ vs. $\bar{P}$, $\bar{S}$ vs. $\bar{P}$, and, $\bar{A}$ vs. $\bar{S}$ values are mean difference values based on scores presented in tables 8 and 9.

obtained including session 6. The total group of 16 subjects swam an average of 0.67 second faster under influence of amphetamine than placebo ("t"=1.86; $p<0.10$). The corresponding improvement was 0.53% ("t"=1.89; $p<0.10$).

Data from Phase 1.—Fourteen swimmers and six runners were studied in phase 1 while medicated with placebo or 7 mg. of amphetamine per 70 kg. body weight. The results obtained with each subject are presented in table 14. That table also indicates the event performed by each subject, the number of placebo and amphetamine medicaments used, the time interval between taking the medicament and beginning the performance, and whether the event was performed individually or competitively. Since a wide range of distances is represented among these subjects (50 yd. to 440 yd. for the swimmers, and 440 yd. to two miles for the runners) we carried out statistical tests only on the percentage improvement or impairment scores shown in the last column on the right. Eleven of the 14 swimmers swam faster under influence of amphetamine than placebo. The mean improvement for the swimmers taken as a group was 0.53%. This group improvement yields a "t" value of 2.04, which is beyond the 0.10 level of significance using a two-tailed test. The nine subjects who swam individually contributed considerably more to the group improvement than did those five who swam in competition.

Two of the six runners ran faster under influence of amphetamine than placebo. Four ran slower. The average impairment was 0.40% and did not reach the 0.20 level of significance.

TABLE 11.—*Comparative Effects, in Experiment 6, of Amphetamine Sulfate and Placebo on Performance Times of Sixteen Subjects Swimming under Rested Conditions Two Hours After Medication.*

	Time in Seconds				
Subject No Free style, 100 yd.	"Steak Time" Goal	$\overline{P}$	$\overline{A}$	$\overline{P}$-$\overline{A}$	$\frac{\overline{P}-\overline{A}}{\overline{P}}$, %
1	55.20	55.68	54.58	+1.10	+1.98
2	58.20	58.31	57.30	+1.01	+1.73
3*	55.50	56.83	57.00	−0.17	−0.30
Butterfly, 100 yd.					
4*	62.50	63.46	62.67	+0.79	+1.24
5	66.20	66.23	65.11	+1.12	+1.69
6	75.80	77.18	77.70	−0.52	−0.67
Free style, 200 yd.					
7	126.20	130.59	130.21	+0.38	+0.29
8	136.20	136.28	137.55	−1.27	−0.93
9	136.10	137.80	136.33	+1.47	+1.07
Back stroke, 200 yd.					
10	158.20	157.39	154.98	+2.41	+1.53
11	165.20	166.89	167.79	−0.90	−0.54
12*	142.00	145.03	141.71	+3.32	+2.29
Breast stroke, 200 yd.					
13*	158.20	156.13	155.54	+0.59	+0.38
14*	171.20	176.74	177.09	−0.35	−0.20
15	175.90	174.31	173.37	+0.94	+0.54
16	171.20	171.47	171.28	+0.19	+0.11

* Subjects 3, 4, 12, 13, and 14 were the five who swam alone. The others swam in competition—groups of two or three men.

Comment

Problems of Control.—Detailed and perhaps tedious descriptions have been given of the attempts made in the various experiments to control all factors which might influence the comparisons of amphetamine and placebo. Where weather variables, lack of interest, or cooperation on the part of subjects or other factors appeared to influence the results, we have so indicated. The reader has been burdened with these details because we believe they are essential to evaluation of the results presented. A perfectly "controlled" experiment on the behavior of human subjects is an ideal rarely if ever achieved. In the experiments presented above, three things were done to maximize control over extraneous factors. First, the cooperation of the subject was sought by explaining the general purpose of the investigation and by stressing the fact that he was more than just the subject. We tried to inspire all subjects to meet the responsibilities imposed by the experiment. An overwhelming majority of the subjects did so.

TABLE 12.—*Statistical Evaluations in Experiment 6, of the Comparative Effects of Amphetamine Sulfate and Placebo on Performance Times of Sixteen Subjects Swimming Under Rested Conditions Two Hours After Medication.*

	$\overline{\overline{P}-\overline{A}}$*	"t"	P	$\overline{\frac{\overline{P}-\overline{A}}{\overline{P}}, \%}$†	"t"	P
100-yd. swimmers (n=6)	+0.56	1.90	0.20	+0.95	2.03	0.10
200-yd. swimmers (n=10)	+0.68	1.50	0.20	+0.45	1.49	0.20
Combined groups (n=16)	+0.63	2.14	0.05	+0.64	2.49	0.05
Analysis eliminating two subjects (n=14)	+0.71	2.13	0.10	+0.72	2.50	0.05

* $\overline{\overline{P}-\overline{A}}$=mean difference values based on the $\overline{P}$-$\overline{A}$ scores presented in table 11.

† $\overline{\frac{\overline{P}-\overline{A}}{\overline{P}}}$, %=mean difference values based on the $\frac{\overline{P}-\overline{A}}{\overline{P}}$, % scores presented in table 11.

TABLE 13.—*Comparative Effects of Amphetamine Sulfate and Placebo on Performance Times of Five Groups of Subjects, Swimming Under Rested Conditions Two Hours After Medication.*

	$\overline{\overline{P}-\overline{A}}$*	$\overline{\overline{P}-\overline{A}/\overline{P}, \%}$†
100-yd free style swimmers (n-3)	+0.65	+1.14
100-yd butterfly swimmers (n-3)	+0.46	+0.75
200-yd free style swimmers (n-3)	+0.19	+0.14
200-yd back stroke swimmers (n-3)	+1.61	+1.09
200-yd breast stroke swimmers (n-4)	+0.34	+0.21

* $\overline{\overline{P}-\overline{A}}$ = mean difference values based on the $\overline{P}$-$\overline{A}$ scores presented in table 11.

† $\overline{\frac{\overline{P}-\overline{A}}{\overline{P}}}$, %=mean difference values based on the $\frac{\overline{P}-\overline{A}}{\overline{P}}$, % scores presented in table 11.

Second, devices were developed to enable the subject to report his subjective reactions before, during and after each performance. This material will be reported subsequently.

Third, the experiments were designed so that each subject would be studied several times under each drug, the aim being to minimize the effects of inevitable chance factors which might influence any single performance.

Recapitulation of Findings.—The experiments presented above indicated that 14 mg. of amphetamine per 70 kg. of body weight taken two to three hours before running, swimming, or weight throwing improved the performance of the athletes, considered as groups. (Some individuals in each group showed impairment rather than improvement). In the first experiment, 14 of the 15 swimmers (93%) were helped by amphetamine when swimming under rested conditions and 67% were helped when swimming under fatigued conditions. In experiment 6, swimming under rested conditions at maximum or near maximum motivation, 69% were helped. Of the 26 runners tested under rested conditions in experiments 2, 3, and 4, 73% were helped. Eighty-five percent of the weight-throwers tested under rested conditions were helped. The improvement shown by all three groups of athletes was statistically significant. The levels are indicated above.

Table 14.—*Comparative Effects of Amphetamine Sulfate and Placebo on Performance Times of Six Runners and Fourteen Swimmers.**

Subject No.	Distance of Performance, Yd.	Type of Performance	Hr. After Medication	Competitive or Individual	#P	$\bar{P}$	#A	$\bar{A}$	$\bar{P}$-$\bar{A}$	$\frac{\bar{P}-\bar{A}}{\bar{P}}$, %
Runners										
1	3,520		1	I	3	10:03.55	3	10:28.13	−24.58	−4.07
2	1,760		1	I	3	5:20.27	3	5: 9.23	+11.04	+3.45
3	440		1	I	3	50.38	3	50.95	− 0.57	−1.13
4	440		1	I	3	55.09	3	54.70	+ 0.39	+0.71
5	880		1	I	3	2:24.32	3	2:24:50	− 0.18	−0.12
6	880		1	I	3	2:09.85	3	2:11.42	− 1.57	−1.21
Swimmers										
1	440	free style	2.5	C	4	5:14.13	4	5:18.75	− 4.62	−1.47
2	440	free style	2.5	C	3	5:01.6	3	5:02.9	− 1.30	−0.43
3	75	free style	2.5	C	4	38.63	3	38.50	+ 0.13	+0.34
4	50	free style	2.5	C	3	23.1	3	22.87	+ 0.23	+1.00
5	50	free style	2.5	C	3	25.47	3	25.23	+ 0.24	+0.94
6	75	butterfly (dolphin)	1	I	3	47.80	3	47.00	+ 0.80	+1.67
7	75	free style	1	I	3	41.17	3	41.15	+ 0.02	+0.05
8	75	free style	1	I	3	39.70	3	39.63	+ 0.07	+0.18
9	75	free style	1	I	6	39.25	6	38.57	+ 0.68	+1.73
10	200	free style	1	I	3	2:12.50	3	2:10.77	+ 1.73	+1.31
11	100	free style	1.75	I	9	61.02	5	61.56	− 0.54	−0.88
12	100	butterfly (dolphin)	1.75	I	7	71.59	4	71.28	− 0.31	+0.43
13	440	free style	1.75	I	10	5:28:52	5	5:24:34	+ 4.18	+1.27
14	75	butterfly (wedge)	1	I	3	49:70	3	49:10	+ 0.60	+1.21

* #P and #A indicate the number of placebo and amphetamine sessions, respectively. The other symbols are defined in earlier tables. The $\bar{P}$ and $\bar{A}$ times are expressed in minutes and seconds. See text for report on statistical analysis of above data.

In terms of the amount of improvement shown by the three classes of subjects, the weight-throwers were first. As a group they showed an improvement of from 3 to 4%. The 26 runners had a mean improvement of approximately 1.5%. The swimmers showed varying degrees of improvement in the various test situations (from 0.59 to 1.16%). The amount of improvement shown has practical importance as well as statistical significance. The subjects of this study were highly trained athletes. Such individuals may spend months working for an improvement of 1 or 2%.

The 100 mg. per 70 kg. dose of secobarbital produced a significant impairment in the performance of the subjects (15 swimmers in experiment 1) receiving it. The 50 mg./70 kg. dose produced effects which were in general not significant. Two groups of runners showed slight impairment, and one group showed slight improvement of performance. The weight-throwers obtained a slight improvement. One subgroup of subjects in the latter study obtained an improvement in performance under 50 mg. of secobarbital which was statistically significant. (The secobarbital was used primarily to prevent the subject from correctly assuming he had received a "pep pill" whenever he thought he perceived drug-effects. It was also included to permit a study of the relationship between mood change and change in performance. Both amphetamine and secobarbital are thought to have euphoretic power. Data concerning these questions will be presented later.)

Considered as groups, the 15 swimmers of experiment 1 and the 17 runners of experiments 2 and 3 performed poorer (under placebo) during the experimental sessions than during meets with other schools. No such comparison was possible with the 9 marathon runners because they did not run competitive distances for the experiment. Considered as a group, the 13 weight-throwers threw as far in the placebo experimental sessions as in meets. The 16 swimmers of experiment 6, who performed under the special motivation described above, achieved experimental times which were, in general, equal to their meet times.

Generalization Concerning Intercollegiate Competition.—The findings presented above do not prove that athletes performing in intercollegiate meets would be helped by amphetamine. Practical considerations prevented our testing the drug under conditions of official school competition. However, experiments 5 and 6 succeeded in obtaining "all out" efforts from the subjects and thus provided pertinent information which should be stressed. Experiment 6 was designed specifically to stimulate maximum effort and to approximate the psychological atmosphere of a competition with another college. The 16 subjects, considered as a group, swam as fast during the experimental sessions as they had during meets with other schools. Under these circumstances amphetamine produced an improvement in performance which was significant beyond the 0.05 level.

In experiment 5 the 13 weight-throwers achieved experimental performances which were as good as those they achieved in intercollegiate meets. Here, also, amphetamine produced an improvement for the group which had both practical and statistical significance. The average improvement was from 3 to 4%.

Both the subjective data to be reported subsequently and the measured performance data reported above, indicate that amphetamine sulfate, in the 14 mg. per 70 kg. of body weight dose, taken two to three hours before an intercollegiate meet will improve the performance of the majority of runners, swimmers, and weight-throwers.

Summary and Conclusions

Six experiments were carried out on swimmers, runners, and weight-throwers to determine whether amphetamine sulfate in the dose of 14 mg. per 70 kg. of body weight improves the measured performance of such athletes. The experiments employed the double-blind procedure, placebos, and additional comparison medications (50 and 100 mg. per 70 kg. of secobarbital). Eighteen swimmers were studied a total of 453 times, 26 runners gave 205 performances, and 13 weight-throwers gave 123. The medicaments were given orally, and the performances were measured from two to three hours after the subjects had taken either amphetamine or placebo. The experimental conditions maintained and the methods used to evaluate performance were described in detail. The results of each experiment were evaluated statistically. Data obtained in an exploratory investigation using a smaller dose level of amphetamine (7 mg. per 70 kg.) were also reported.

In all three classes of athletes, the majority of subjects performed better under influence of amphetamine (14 mg. per 70 kg.) than placebo. The improvement was statistically significant for all three classes of athletes. Eighty-five per cent of the weight-throwers, 73% of the runners, and from 67 to 93% of the swimmers performed better under influence of amphetamine than placebo. The weight-throwers obtained the greatest amount of improvement from amphetamine (from 3% to 4%); the runners obtained an improvement of approximately 1.5%; the swimmers showed varying degrees of improvement in the various test situations (from 0.59 to 1.16%). The relationship of the data obtained to the use of amphetamine in intercollegiate competition was discussed.

This study has shown that the performance of highly trained athletes, of the classes studied, can be significantly improved in the majority of cases (about 75%) by the administration of amphetamine.

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INCREASING IMPORTANCE OF LEUKEMIA.—A disease which has doubled its incidence in 9 years is worthy of attention, even if it presents only a comparatively small threat to public health.

In Western Germany the number of deaths registered as due to leukaemia, including aleukaemia leukaemia, doubled between 1948 and 1956. The increase was greater in women than in men, so that the previously marked difference in incidence between the sexes has been narrowed. The greatest increase has taken place in old people; certain other age groups show little or no increase. Part of the increase may be due to improvement in medical care, but it remains open to what extent this factor is responsible.—G. Neumann, The Mortality from Leukaemia in Western Germany from 1948 to 1956, *German Medical Monthly,* March, 1959.

EFFECT OF AMPHETAMINE SULFATE ON ATHLETIC PERFORMANCE

Peter V. Karpovich, M.D., Springfield, Mass.

Recently there has been a great deal of agitation regarding the use of amphetamines in athletics. This agitation has been based mainly on rumors or secondhand information regarding one or two athletes who reportedly have admitted the use of amphetamine (Benzedrine) sulfate. It is, however, not known how these athletes would have performed with and without this drug under conditions of a controlled experiment.

While it is well known that amphetamines can cause euphoria and various degrees of insomnia which prolong wakefulness which might be used for activity, no reliable evidence exists that amphetamines are effective in increasing either endurance or speed in athletic activities. For this reason, the present study was undertaken. This study was so designed that it would be possible to detect the effect of the drug on endurance, recuperative ability, and speed of athletic performance under two conditions: "laboratory" conditions and under emotional stress during actual athletic competition.

Methods

Activities.—The following activities were included: (1) running to exhaustion on an electrically driven treadmill at 7.2 mph and 5-degree inclination twice in succession with a 10-minute rest in between the runs, (2) swimming 100 yd. as fast as possible twice in succession with a 10-minute rest in between, (3) swimming 220 and 440 yd. once on each testing day, (4) running 220 yd. on an outdoor track for time trials, and (5) running various distances (from 100 yd. to 2 miles) during competition. Altogether 532 tests were used for statistical analysis.

All "laboratory" experiments consisted of six tests done on six different days, three times with the drug and three times with a placebo. Experiments during actual contests were planned so that each subject would run from four to eight times, one-half of the runs with amphetamine and one-half without. However, since it was not always possible to know ahead of time what subject would take part in the contest, the number of tests and the order of administration of the drug and placebo varied.

Medication.—From the standpoint of medication, this study may be divided into two parts. In 1958 all but four subjects were given a capsule of 10 mg. of amphetamine sulfate one hour before the test. These four subjects received 20 mg. 30 minutes before the test. The drug and the placebo were administered from six coded bottles and given to subjects in rotating order. Neither I nor my assistants knew the code, which was kept in the A. M. A. headquarters on my request.

In 1959, although the drug and the placebo were administered from coded bottles, I, but not my assistants, knew the code. This was done in order to expedite the detection of individuals who were affected either beneficially or deleteriously by the drug so that they could be subjected to additional tests. In 1959 all subjects received 20 mg. of amphetamine or placebo 30 minutes before the test. In both series, the placebo was made of calcium lactate.

Subjects.—All subjects were male college students. Most swimmers and all trackmen were varsity men. All the treadmill runners, some of whom were also varsity men, received preliminary training in running on the treadmill. Twenty-five men were used on the treadmill, 18 in swimming, and 11 in track time trials during competition. Altogether, 54 subjects were used. All subjects had a medical examination. Blood pressure and pulse rate were taken on several occasions one-half hour and one hour after medication. Since no particular variations were observed, this procedure was discontinued.

*Mean Time (in Seconds) of Performance With and Without Amphetamine**

	Swimming 100 Yd. (11 Men)			Swimming		Track			Treadmill (11 Men)			Treadmill (10 Men)			Treadmill (Special Group of 4 Men)		
	1st Swim	2nd Swim	Difference	220 Yd. (16 Men)	220 Yd. (11 Men)	440 Yd. (9 Men)	220 Yd. (9 Men)	Competition† (12 Men)	1st Run	2nd Run	Difference	1st Run	2nd Run	Difference	1st Run	2nd Run	Difference
Amphetamine	62.34	62.81	0.47	168.62	151.2	311.6	25.13	99.4	391.06	281.63	109.43	241.40	232.79	8.61	232.2	169.8	62.4
Placebo	62.33	63.20	0.87	169.64	151.6	311.0	25.15	100.0	398.24	279.72	118.52	258.60	227.44	31.16	249.7	148.2	101.5
Amphetamine minus placebo	0.01	—0.39	—0.40	—1.02	—0.4	0.6	—0.02	—0.6	—7.18	1.91	—9.09	—17.20	5.35	—22.55	—17.5	21.6	—39.1
Amphetamine, 1st plus 2nd	125.15								672.69			474.19			402.0		
Placebo, 1st plus 2nd	125.53								677.96			486.04			397.9		
Amphetamine total minus placebo total	—0.38								—5.27			—11.85			4.1		

* Subjects in each group, except "Treadmill (10 Men)," received at least 6 tests. In this group only 4 tests were given. Analysis of variance of performance time and also of variance in time differences between first and second "runs" in swimming and treadmill running showed no statistically significant differences between effects of amphetamine and placebo.

† Varsity meets, 100, 220, and 440 yd.; ½, 1, and 2 miles. Time of running with the placebo was taken as 100%.

From the Department of Physiology, Springfield College.

Results

Treadmill Runs.—Tests with 10 mg. of amphetamine given to 11 subjects one hour before the run showed no evidence of either a beneficial or deleterious effect of the drug on the endurance and recuperation from fatigue. From the table it may be seen that the average times for the first runs were 391.06 seconds with the drug and 398.24 seconds with the placebo. The duration of the second run was 281.63 seconds with the drug and 279.72 with the placebo. The average total times were 672.69 seconds and 677.96 seconds respectively. Analysis of variance of times showed that the differences between the figures in each pair were not statistically significant.

Tests with 20 mg. of amphetamine given to 10 subjects one-half hour before the run also gave no statistically significant difference (see table).

Tests with Amphetamine on a Special Group: Four men, highly interested in the experiment and therefore highly motivated to do their utmost, were each tested seven times. Most of the subjects felt a sense of euphoria after taking the capsule containing 20 mg. of amphetamine, the effect being noticeable about 30 minutes after taking the capsule. They also thought that they could run longer when they felt this effect, but they did not.

It may be observed from figure 1 that the best times for the first runs were obtained by all subjects during the last session regardless of the chemical taken: two of the subjects had taken amphetamine and the other two a placebo. The psychological effect of the knowledge that it was the last test was obvious. Although the average results obtained for the entire group are the same as those obtained in other treadmill experiments, there was a definitely different reaction on the part of one of the subjects. Subject 3 (figure 1) exhibited a deleterious effect of amphetamine. His drug times were shorter than the placebo times. The average drug time was only 284 seconds, whereas the placebo time was 357 seconds. Unfortunately this subject was not available for further experimentation. Subject 2 showed a puzzling behavior occasionally observed in experiments involving endurance testing and not related to the chemicals consumed. His first and last runs were the best. Since the improvement in the last run had psychological reason, a similar interpretation may be suggested regarding the first run.

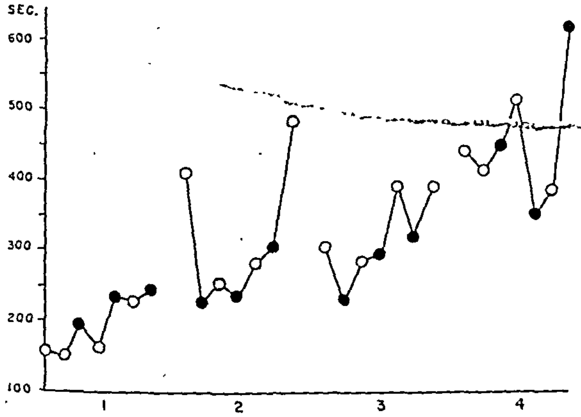

Fig. 1.—Effect of amphetamine (20 mg. taken one-half hour before test) on treadmill running time. Speed, 7.2 mph; angle of inclination, 5 degrees. (Solid dot, amphetamine; open dot, placebo.)

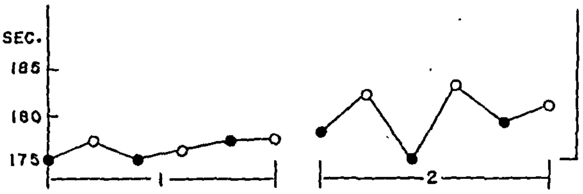

Fig. 2.—Effect of amphetamine (20 mg. taken one-half hour before the test) on speed of swimming 220 yd. Part 1 was obtained during the swimming season and part 2 after season. (Solid dot, amphetamine; open dot, placebo.)

Swimming.—Tests were made with 10 mg. of amphetamine given to 11 subjects one hour before swimming 100 yd. The average time for the first swim was 62.34 seconds with the drug and 62.33 with the placebo. For the second swim the times were 62.81 and 63.20 seconds respectively (see table). Analysis of variance showed that these differences were not statistically significant. Thus no beneficial or deleterious effect of amphetamine was observed on either the speed of swimming or recuperation from fatigue.

Tests were also made with 20 mg. of amphetamine given 30 minutes before swimming. Nine subjects swam 440 yd. The average drug time was 311.6 seconds and the placebo time 311.0. Two groups of subjects swam 220 yd. In one group, consisting of 16 men, the average drug time was 168.62 seconds and placebo time was 169.64 seconds. In the second group, consisting of 11 men, the times were 151.2 and 151.6 seconds respectively. Statistical analysis showed that the difference between each pair of figures was not statistically significant.

Inspection of the time graphs made for each subject showed that there were three subjects whose speed was increased by the amphetamine. Figure 2 shows a time graph prepared for one of these subjects. This graph consists of two parts. Part one was obtained when the subject was at the peak of condition. During this period, one can see a trend. The two fastest times were made with the drug during part two, after the swimming season was over, and the subject's speed fluctuated eight seconds instead of two seconds as in part one. The effect of amphetamine was observed each time he took the drug. The second man, a much faster man whose time varied from 143 seconds to 146 seconds, swam faster each time he took amphetamine. Without the drug, his average time was 146 seconds; with the drug it was 143.3 seconds. One subject swam 440 yd. faster each time with amphetamine than with placebo. This average drug time was 301.6 seconds, and placebo time was 303.3 seconds. His swimming time for 220 yd., however, was not affected.

Track Running with Amphetamine Taken One Hour Before Test.—Nine varsity men were tested six times, after taking 10 mg. of amphetamine, each in time trials for 220-yd. runs. The average running time after taking amphetamine was 25.13 seconds and after taking the placebo 25.15. Analysis of variance showed that there was no statistically significant difference between the times.

Competitive Track Runs.—Twelve men made 65 runs in seven events: 100 yd., 220 yd., 220 yd. with low hurdles, 440 yd., ½ mile, 1 mile, and 2 miles. If the time of running after taking the placebo is given a value of 100%, the average time of running after taking the drug is 99.4%. The best time was made 11 times with the drug and only 9 times with the placebo. There were two ties. This observation, however, cannot be accepted as even an indication of a trend.

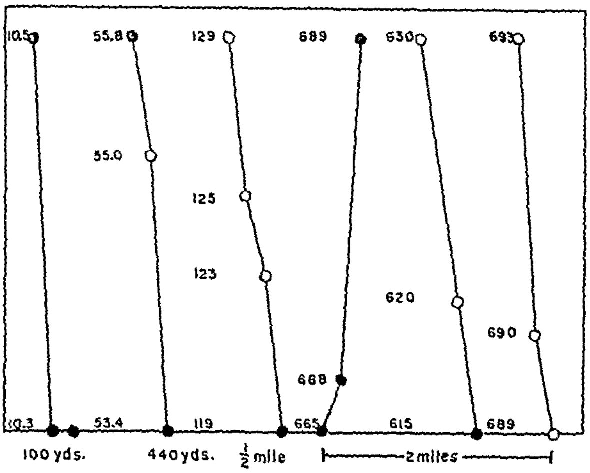

Fig. 3.—Time graphs obtained during intercollegiate track meets. Running time of some subjects improved and that of some deteriorated regardless of the chemical taken. (Solid dot, amphetamine [20 [illegible] one hour before the run]; open [illegible], placebo.)

An inspection of the individual time graphs shows a disturbing fact (fig. 3). Some runners showed a consistent improvement in speed and some a consistent deterioration in performance regardless of the chemical taken.

Looking at the 100-yd. record, one may assume that this man improved under the influence of the amphetamine. The 440-yd. man improved also, even though before his second run he received the placebo. The half-miler kept on improving while getting placebos, and one may suppose that he would have improved during his last run if the placebo instead of amphetamine had been given (as happened with the last two-miler). The first two-miler's performance became steadily worse in spite of or because of amphetamine.

Comparison of weather and track conditions with the records failed to show any relation. If by chance tests were made only on subjects 1, 3, or 5, conclusions could be drawn that amphetamine increases the speed of running. The graphs 4 and 6 in figure 3 will make one wonder. It is quite possible that these steady changes in performance are not related to the effect of the drug at all.

Subjective Reports

Subjects were asked to report any unusual sensation, comfortable or otherwise, and whether they slept well or not. When 10 mg. of amphetamine was given, the placebo was blamed or praised as often as the drug. When 20 mg. was given, the subjects were 75% correct in guessing when they had been given the "pep pills." Some complained of difficulty sleeping. The latter was remedied equally well by a sedative or another capsule of placebo. The four subjects in the special treadmill group usually guessed correctly when amphetamine was administered. In this group there was a man from India who had never taken any drugs in his life and was at first reluctant to join in the experiment. He could always guess correctly whether it was a drug or a placebo that had been taken. However, this did not affect his running time.

Comment

During the experiment subjects did not know what drug was being investigated. Their guesses ranged from amphetamine to tranquilizers. The medication schedule was adhered to strictly except in one instance when a man, after taking the drug, ran half an hour later than scheduled. When, on one occasion, trackmen did exceptionally well, they begged for more of the "miracle pills." Subsequent examination of records revealed that some of these "miracle pills" were placebos.

Examination of individual records of competitive runs shows that for no known reason some athletes steadily improved and some steadily declined in proficiency during the last three meets. If, by chance, only certain men had been used in this study, results could have been either definitely in favor of or definitely against amphetamine.

Four subjects in the special treadmill group gave their best performance during the last test. It was fortunate that two of them had received amphetamine and two the placebo. If they all had received the same chemical, interpretation of the results would have been more difficult.

There are other stumbling block may be
encountered. On one occasion, a mproved
his endurance 88% (from 402 se
onds) after taking 10 ıg. of ar
ever, a few days other

taking 10 mg. of placebo, improved his endurance more than 132% (from 860 seconds to 2,000 seconds). He ran on three more occasions, twice with the drug and once with the placebo, but his time never surpassed 958 seconds. This particular man was a good distance runner and very cooperative. He could not offer any acceptable explanation of his phenomenal run. Such unusually long running times immediately arouse a suspicion that these two men were not always running to the limit of their ability, a suspicion easily aroused when tests depend on maximum voluntary performance. However, there was no other tangible evidence on which to suspect these two subjects of shirking their pledges, and they were retained in the experiment.

Observations similar to this have been made by me during other experiments involving endurance. No suitable explanation has ever been found.

The results obtained during track contests were different from those obtained on the same men during the 220-yd. trials. Whereas during the trials no effect on performance was discovered, the data obtained during athletic competitions could be interpreted in a manner fitting the fancy of the interpreter. All reports regarding the ergogenic action of chemicals obtained from studies of single individuals or small groups should be regarded with extreme caution. It is also advisable to plot performance graphs for each subject, so that any unusual reaction can be discovered immediately and followed up with additional tests.

Summary and Conclusions

In an investigation of the effect of amphetamine sulfate on the athletic performance of 54 male college students, the drug was given in doses of 10 and 20 mg., either one hour or one-half hour before the test. Activities used were as follows: running to exhaustion on a treadmill twice in succession with a 10-minute rest in between, running 220-yd. track time trials, running distances from 100 yd. to 2 miles under competitive conditions, swimming 100 yd. twice in succession with a 10-minute rest in between, and swimming 220 and 440 yd. Altogether 532 tests were statistically analyzed. All subjects but four showed neither beneficial nor deleterious effects of 10 or 20 mg. of amphetamine. Three of the four subjects definitely improved in swimming 220 yd., while one improved in swimming 440 yd. One treadmill subject showed a deleterious effect of amphetamine. He ran longer after taking the placebo than after the amphetamine. Thus, three of the subjects were definitely benefited by the amphetamine, and one man was affected deleteriously. All these men received 20 mg. of amphetamine.

I wish to thank Messrs. Derwood Stetson, John Hichwa, Chalasani Rao, and Coach Charles E. Silva and his staff for assistance with the experimental work; Drs. Clifford E. Keeney and Emery Seymour for statistical help; and Miss Clare E. Condron and Mr. Richard McCorkle for assistance in preparation of the manuscript.

This study was aided by a grant from the American Medical Association.

MYXEDEMA.–Myxedema is the commonest form of thyroid disease seen by the physician. . . . Since the use of radio-iodine therapy has become widespread, two types of decreased thyroid function are seen. The first is a transitory state occurring about three to six months after therapy, which we have called hypothyroidism. The patient complains of feeling the cold and of gain in weight, while the diastolic blood pressure has always been found to be elevated in these patients. They do not show the florid features of myxedema and respond well to replacement therapy with moderate doses of thyroid gland extract. The importance of the separation of this group is that the symptoms are temporary and, after six months' therapy, the thyroid apparently recovers. It is probably due to temporary excess destruction of the secreting tissues, or to too prolonged use of antithyroid drugs after radioactive iodine therapy. Unfortunately, typical permanent myxedema may be seen after radio-iodine therapy . . . (most figures vary between 5% and 10%). The recent discovery of triiodothyronine and the acetic acid derivatives has stimulated investigation of their use in myxedema. All these substances have been found to be effective in relieving symptoms, but it is generally agreed that they are not suitable for general use. Triiodothyronine is two to five times more potent than thyroxine. Its action is rapid and may therefore precipitate cardiac complications in the elderly. There is a very definite withdrawal syndrome, seen within 24 hours of ceasing therapy. There is a rapid return of the symptoms and signs of myxedema, which may be even more severe than before treatment. This, of course, is explained by the rapid dissociation of triiodothyronine from the globulin in the serum to the intracellular department. Its main use is in myxedema coma, in which it may be lifesaving.–W. E. King, Medical Aspects of Thyroid Disease, *The Medical Journal of Australia,* Dec. 20, 1958.

THE JOURNAL
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USE OF AMPHETAMINES IN ATHLETICS

GUEST EDITORIAL

Allan J. Ryan, M.D., Meriden, Conn.[*]

IN JUNE, 1957, a resolution presented to the House of Delegates of the American Medical Association condemned what was alleged to be a widespread use of amphetamine substances by coaches, trainers, and athletes to improve athletic performance. As a result, the Board of Trustees appointed a special committee to investigate these charges. The *ad hoc* Committee on Amphetamines and Athletics conducted a survey of opinions and practices among those connected with the direction and training of athletes. This was done with the cooperation of the National Collegiate Athletic Association, the National Association of Intercollegiate Athletic Associations, and the National Federation of High School Athletic Associations. After many contacts with physicians and other persons connected with amateur and professional sports, the Committee reported to the Board of Trustees that the observed use of these drugs is apparently very small.

A review of the available literature relating to the pharmacology and uses of the amphetamines failed to reveal any well-substantiated evidence that any improvement in athletic performance could be expected as the result of their administration. Dr. Henry K. Beecher, a member of the Committee, therefore volunteered to undertake a study at Harvard University in order to help answer this question. In the meantime it was discovered that Dr. Peter V. Karpovich had already planned a similar investigation at Springfield College in Massachusetts. The Board of Trustees agreed to provide financial support to the Harvard project and assistance to the Springfield investigation. Dr. Karpovich agreed to consult with the Committee regarding his plans and his findings.

The results of these two investigations, which were conducted independently and according to quite different plans, are published in this issue of THE JOURNAL. The Harvard study clearly shows that, when amphetamine is given in a large enough dose (14-21 mg. per 70 kilograms of body weight) and from two to three hours before the test, improvement in speed performance of runners and swimmers, and distance achieved by weight throwers, occurs in about 75% of trained athletes. The Springfield study, using smaller doses with a much shorter time interval (one-half to one hour) showed improvement in performance in only three instances.

Since the use of any drug to improve athletic performance has already been made grounds for disqualification by the International Amateur Athletic Federation, the Amateur Athletic Union, and the United States Olympic Association as being contrary to the highest ideals of sportsmanship, and since the use of amphetamines even in moderately small doses is known in many instances to result in habituation and harmful effects, the Committee has recommended that the use of amphetamines for this purpose be condemned. Because these drugs can be obtained legally only on prescription, a serious obligation devolves on physicians to help prevent such usage by prescribing them only for well-recognized medical indications. It is acknowledged there is an illegal traffic in the amphetamines in the United States and that problems of its control still remain to be solved.

MEDICAL LICENSURE

In the 57th annual report on medical licensure prepared by the Council on Medical Education and Hospitals, which appears in this issue, data are presented concerning the medical examination and the licensure of physicians in the United States and its territories and outlying possessions for 1958. The report also summarizes trends in licensure over many years and presents current regulations pertaining to medical licensure. A section is included pertaining to boards of examiners in the basic sciences and the National Board of Medical Examiners.

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[*] Chairman, A. M. A. *ad hoc* Committee on Amphetamines and Athletics.

The report calls attention to the nine workshops conducted over a three-year period by the Federation of State Medical Boards of the United States. At these workshops major areas of concern the evaluation of fitness of a state board of medical examiners were subjected to a critical analysis. Relation of concern by a state board to the status of medical education as it exists today in respect to both the medical school and the advanced postgraduate levels of education and training activity was a major consideration.

In 1958, a total of 15,240 licenses to practice medicine were issued by 55 boards authorized by law to grant licenses to practice the art and science of medicine. The 15,240 licenses issued last year represented 7,315 granted after a successful written examination, and 7,925 granted by reciprocity and endorsement of state licenses or the certificate of the National Board of Medical Examiners.

Additions to the medical profession are reflected in a number of tables included in this study. There were, 7,809 physicians who secured their first license to practice medicine and surgery during the calendar year 1958. In the same year, approximately 3,700 deaths of physicians were reported to the offices of the American Medical Association. Thus, the physician population in the United States and its territories and possessions was increased by 4,109.

Failures by graduates of approved medical schools in the United States amounted to 4.3% and by graduates of approved medical schools in Canada 8.3%. The percentage of failures in three other groups—graduates of foreign faculties of medicine, unapproved medical schools, and schools of osteopathy—were 40.9, 76, and 22.2 respectively.

Provision is made by 38 boards for the issuance of temporary and educational permits, limited and temporary licenses, or other certificates of limited registration. The terms for the issuance of these certificates vary and may apply to hospital training, to those ineligible for licensure who seek further educational training, for practice in emergency areas, or for regular practice until the next regular session of the licensing board when permanent licensure is granted. The study further outlines the licensure requirements for interns and residents in hospitals, the states which require an internship for licensure, the preprofessional and professional educational requirements of each licensing board, the schedule of written examination dates and reciprocity meetings, medical license fees, licensure on government credentials, and annual registration requirements.

The Educational Council for Foreign Medical Graduates is referred to briefly in this report and attention is called to the analysis of this evaluation service for foreign medical graduates by Dr. Dean F. Smiley, executive director, which appears elsewhere in this issue.

The Council's study reveals that graduates of foreign medical schools were examined for medical licensure by 43 boards in 1958. Graduates of 231 medical schools and 4 licensing corporations were examined, representing medical schools in the Philippines, New Zealand, 13 South and Central American countries, 26 countries in Europe, and 15 countries in Asia. More than 75 graduates each from the universities of Havana, Munich, Athens, Rome, Mexico, and Geneva were tested in 1958, and more than 20 graduates from 33 other schools were examined. The number who were successful in these tests was 1,518. Failures numbered 1,049, or 40.9% of those examined. Since 1944, there has been a noticeable increase in the number of foreign-trained physicians seeking licensure in the United States. In 1958, the increase over the previous year was 268. During 1958 there were 1,166 foreign-trained physicians licensed who represent additions to the medical profession having secured their first license during the year. Of this group, 1,129 were licensed by written examination and 37 by endorsement of credentials. In an eight-year period, it was shown that 6,483 foreign-trained physicians were added to the physician population of the United States.

That portion of the report pertaining to the results of examinations given by the 22 boards of examiners in the basic sciences reveals that certificates were issued to 6,269 candidates in 1958. Of these, 3,592 were granted after written examination and 2,677 by reciprocity, endorsement, exemption, or waiver. The failure percentage for those reporting this information was 21.9. The basic science laws do not specify that a candidate reveal his school of practice. No attempt has been made in this study to differentiate between the schools and the healing art represented by the candidates examined or certified.

The last series of tabulations refers to the examinations given by the National Board of Medical Examiners. The certificate of the National Board is accepted as a suitable qualification for the practice of medicine by 46 licensing authorities in the states, the District of Columbia, and the territories of the United States. There were 2,011 physicians who were certified as diplomates last year. The largest number of candidates presenting the same type of credential for medical licensure by endorsement last year were 3,215 diplomates certified by the National Board who were licensed in 43 states, the District of Columbia, Hawaii, and Puerto Rico.

This informative study compiled annually by the Council is made available through the cooperation of the various examining and licensing boards; for their cooperation, the Council and THE JOURNAL wish to express appreciation.

ANESTHETIC DANGERS IN HEREDITARY DISEASES

The article in this issue of THE JOURNAL (page 529) by Kritchman, Schwartz, and Papper has drawn attention to the dangers inherent in administering anesthetics to children with familial dysautonomia. Although this condition is relatively uncommon, affected children may require surgery for a variety of reasons. The most outstanding clinical manifestations of familial dysautonomia are related to abnormality of function of the autonomic nervous system. Kritchman and associates described a series of eight patients who received general anesthesia for 27 surgical procedures. Severe hypotension occurred as a complication of anesthesia six times, and cardiac arrest occurred in two patients, requiring open-chest cardiac massage and resuscitation. Bronchopneumonia and atelectasis were frequent postoperative complications. The instances of circulatory collapse were associated with the use of thiopental sodium or tribromoethanol (Avertin). These investigators recommended the use of local anesthesia or a volatile anesthetic agent if surgery is required in patients with famliial dysautonomia.

An increased anesthetic risk also exists in patients with the hepatic type of porphyria. In these patients the condition often remains undiagnosed for many years, and they are often dismissed as "neurotic." Episodes of abdominal pain that may simulate surgical emergencies are common. Dean [1] described 12 patients in 11 family groups in whom the disease was discovered because of reaction to intravenous barbiturate anesthesia. The diagnosis of porphyria was unsuspected prior to operation. Acute episodes of porphyria with paralysis were induced by the anesthetic, and three of the patients died. Porphyria of the hepatic type is conditioned by an autosomal dominant gene, and we therefore expect one parent and half of the sibs and children of any patient with this type of porphyria to possess the gene and to present either clinical or subclinical evidence of the disease. Dean traced the relatives of his 12 original patients and located 216 relatives with evidence of porphyria, and a number of these had experienced acute exacerbations after barbiturate medication.

It seems at least possible that an increased anesthetic risk may also exist in patients with sicklemia, the carrier or heterozygous state of the gene for sickle cell anemia. Cooley and associates [2] described as a clinical triad the association of massive splenic infarction, sicklemia, and high altitude flying. It is well known that the tendency of erythrocytes containing hemoglobin S to assume the characteristic sickle shape is enhanced by lowering of the oxygen tension. Presumably, partial anoxia induces changes in the erythrocytes which predispose to thrombosis and infarction. Accidental hypoxia is at least a risk during general anesthesia, and patients with sicklemia may develop thromboses if the oxygen tension is reduced sufficiently for a sufficiently long period. As approximately 7% of American Negroes have asymptomatic sicklemia, the proportion of surgical patients exposed to this risk is significant. Doenges and associates [3] have suggested that the much smaller group of persons who have both hemoglobin S and hemoglobin C may be more susceptible to the effects of hypoxia than those with hemoglobin S alone.

It is also worthy of note that patients with gout are likely to have acute exacerbations after any operative procedure. Acute attacks of gout may also be precipitated by trauma and ingestion of alcohol and certain drugs including ACTH; it has been suggested that stress producing a syndrome of increased adrenal cortical activity may be the mechanism common to these precipitating factors.[4] It has also been suggested that patients with gargoylism react poorly to anesthetics.

Observations such as these suggest that we should approach problems of anesthesia and chemotherapy in patients with hereditary diseases with some caution. Mutant genes must produce their effects by some alteration of biochemical function. Specific enzyme deficiencies have been found to be associated with specific genotypes in a number of conditions,[5] but the postulated biochemical change in many other hereditary conditions still eludes definition. The person with genetic differences may be inherently different from the majority of the population in his reaction to some type of environmental stimulation. An unusual reaction, or idiosyncrasy, to an anesthetic or other drug may be an expression of a genetically determined inherent difference in the patient so reacting. Such reactions will become predictable and preventable only when sufficient observations such as those mentioned above have accumulated and when the predisposing genetic diseases are regularly identified in specific patients and their families.

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MEDICAL LICENSURE STATISTICS FOR 1958

FIFTY-SEVENTH ANNUAL PRESENTATION OF LICENSURE STATISTICS BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS OF THE AMERICAN MEDICAL ASSOCIATION

The data in the following annual report on Medical Licensure Statistics have been compiled by the staff under the supervision of Mrs. Anne Tipner, Assistant to the Secretary of the Council on Medical Education and Hospitals.

Walter S. Wiggins, M.D., Secretary
Council on Medical Education and Hospitals

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INTRODUCTION

Statistical compilations regarding medical licensure are presented annually in the State Board Number of THE JOURNAL. Data are included pertaining to (a) medical examining and licensing boards of the United States, the District of Columbia, and the territories and possessions of the United States, (b) the boards of examiners in the basic sciences, and (c) the National Board of Medical Examiners. The report also contains a résumé of the reevaluation of the medical licensing examination sponsored by the Federation of State Medical Boards of the United States and a summary account of the activities of the Educational Council for Foreign Medical Graduates.

The computations presented are based on official records received throughout the year from all medical examining and licensing agencies of all states, Alaska, the Canal Zone, Guam, Hawaii, Puerto Rico, and the Virgin Islands. Alaska is recognized as a state in these compilations. The figures for Connecticut also include data reported by the homeopathic medical examining board of that state. The only other homeopathic board in operation, in Louisiana, had no new licentiates last year. Data are also included pertaining to the 22 boards of examiners in the basic sciences and, last, the National Board of Medical Examiners. The Council and THE JOURNAL gratefully acknowledge their appreciation to those who have supplied these data as well as other records furnished throughout the year to the American Medical Association.

A NEW ERA IN LICENSURE

At the 55th Annual Congress on Medical Education and Licensure, the Federation of State Medical Boards completed the formal sessions devoted to the reevaluation of the medical licensing examinations. In nine separate workshops covering a three-year period, the major areas of concern in the evaluation of fitness by a State Board of Examiners were subjected to a critical analysis of the relation of concern by a board to the state of medical education as it exists today both in respect to the medical school and the advanced postgraduate levels of educational and training activity.

Combined with the examination institutes, the programs of the federation in the past three years have been designed to explore, both from within and from without, the attitudes of licensure in respect to the necessities of change, the shifting of population groups, and the redefining of what fitness means in terms of the greater stability of medical education today. State Boards are aware now that the earlier introduction of clinical experience and the earlier assumption of responsibility for patient care mean a much more concentrated concern over the quality of fitness by the medical schools prior to the time a student graduates than was the case some years ago. There is now a greater

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In the descriptive data, reference is made to the total number of boards for which figures are reported. The figures include the examining and licensing boards in the territories and possessions and also the homeopathic board of Connecticut.

interest in directions and quality in both preprofessional and professional education and a much more definite tendency to be tolerant to experimental programs in education.

There is no opposition in licensure now to the reallocations of time and the pruning procedures needed in the modern medical curriculum. There is, indeed, a growing interest in the federation in the more radical experiments in medical education and a more intelligent interest in what Dean Berry of Harvard College calls "a dynamic and tremendously complex environment."

At the end of the initial series of institutes, one of the most interesting results was the evidence that the primary challenge of reevaluation of the licensing examination is to the examiner and not to the examinee. It is on this evidence that the federation asserts that it is moving into a new era. The number of examiners who attended one or more of the institutes, and the interest they developed in self-improvement, insures that the responsibility of constructing licensing examinations which involve patient problems will increasingly result in better and more practical examinations.

In summing up the experiences of the institutes, the federation recognized that, with frequent changes occurring on Boards of Examiners, there will be a constant need to orient new members to the newer concepts of the realistic purposes of the licensing examination. As a result, there will be an annual examination institute for this purpose. With this objective, there will be opportunity to review, annually, the significant developments of the past year in respect to progress in experimental programs of education and shifts of interest in the total area involved in the education of the physician.

After the completion of the institutes, it was apparent that the decision of the Federation of State Medical Boards to consider that it was moving into a new era was one based upon a much more definite realization that licensure is a vital component of all the interests which are directed toward preserving and improving the quality of medical care in the United States. Thus, the federation accepts the responsibility of being realistic and tolerant in its attitudes as well as the necessity to maintain a constant concern over its policies and procedures.

The federation faces a number of significant problems for future consideration in the field of discipline, the type and construction of examinations best suited to licensure purposes, the problems related to various types of addiction in the licensed groups operating in the health field, and the educational standards involving the increasing number of ancillary groups attached to the periphery of medical practice.

EDUCATIONAL COUNCIL FOR FOREIGN MEDICAL GRADUATES

The Educational Council for Foreign Medical Graduates began operation on Oct. 1, 1957. It has held three examinations to date. Sponsoring agencies are the American Hospital Association, the American Medical Association, the Association of American Medical Colleges, and the Federation of State Medical Boards of the United States. The Board of Trustees of the Educational Council includes representatives from each of these organizations and two members representing the public at large. Its stated purpose is to provide information to foreign medical graduates, to translate and evaluate foreign educational credentials, and to test the foreign medical graduate's command of English and his basic knowledge of medicine. Elsewhere in this issue, Dr. Dean F. Smiley, Executive Director, presents an analysis of the three qualifying examinations thus far held and outlines the plans for future examinations.

MEDICAL LICENSURE STATISTICS

The tables referring to medical licensure present figures pertaining to the number of candidates examined, the number licensed, and the number who represent additions to the physician population. Data are also included pertaining to the regulations for medical licensure both of physicians who secured their professional training in the United States and Canada and of physicians educated in other countries. The state boards are discussed first, followed by the basic science boards and the National Board of Medical Examiners.

STATE BOARDS OF MEDICAL EXAMINERS

Licenses Issued

In 1958, 15,240 licenses to practice medicine were issued by 55 boards authorized by law to grant licenses to practice the art and science of medicine. The number licensed by each of these boards by examination or by endorsement of credentials is shown in table 1. Of the 15,240 licenses issued, 7,315 were granted after written examination and 7,925 by reciprocity and endorsement of state licenses or the certificate of the National Board of Medical Examiners.

Physicians certified in a given year after written examination were not in all instances tested in that year. Approximately one-half of the boards require a year of internship as a prerequisite for licensure. The candidate for licensure in some states is permitted to write the examination before or while serving an internship and, if he is successful, the license is issued on completion of the internship and dated the year in which issued. Licenses are withheld in some states for other technicalities. In general, also, the licenses of physicians examined in December are dated and issued in the early part of the next year. Table 1, therefore, includes some data on physicians who were examined in 1957 and a few who were examined in previous years. Thus, the figures presented in this table will not correspond with succeeding tables that deal entirely with physicians examined for licensure within the year 1958. In tables 12, 13, and 14 can be noted the number of physicians who secured their first license in 1958 and who thus represent additions to the medical profession in the United States and its territories and possessions.

Of the 15,136 licenses to practice medicine and surgery issued in 1958, both by examination and by reciprocity and endorsement of credentials, the greatest number (2,205) were issued in California. New York licensed 1,584, while more than 500 each were registered in Illinois, Ohio, Pennsylvania, and Texas. Alaska, Delaware, Idaho, Montana, Nevada, North Dakota, South Dakota, Vermont, and Wyoming issued less than 50 each. Among the territories and possessions, Puerto Rico licensed 107, Hawaii 44, the Canal Zone 6, and Guam and the Virgin Islands 2 each. There was an increase of 104 in the total number of licenses issued in 1958 as compared with the previous year. Candidates licensed by reciprocity and endorsement increased by 439 the number licensed in 1957, while those licensed after written examination showed a decrease of 289.

Table 1.—*Licenses Issued, 1958*

	Examination	On Basis of Reciprocity and Endorsement	Total
Alabama	71	71	118
Alaska	5	16	21
Arizona	17	98	115
Arkansas	88	40	128
California	549	1,650	2,205
Canal Zone	..	6	6
Colorado	80	121	201
Connecticut	129	221	350
Delaware	7	19	26
District of Columbia	7	172	179
Florida	461	..	461
Georgia	267	91	358
Guam	..	2	2
Hawaii	29	15	44
Idaho	3	35	38
Illinois	391	173	564
Indiana	179	129	308
Iowa	92	88	180
Kansas	128	34	162
Kentucky	95	99	194
Louisiana	261	121	382
Maine	37	41	78
Maryland	290	190	480
Massachusetts	31	379	410
Michigan	309	169	478
Minnesota	200	162	362
Mississippi	124	32	156
Missouri	266	127	393
Montana	1	34	35
Nebraska	111	30	141
Nevada	3	41	44
New Hampshire	8	44	52
New Jersey	154	340	494
New Mexico	3	52	55
New York	430	1,154	1,584
North Carolina	197	71	268
North Dakota	15	19	34
Ohio	469	345	814
Oklahoma	82	50	132
Oregon	30	77	107
Pennsylvania	517	241	758
Puerto Rico	61	46	107
Rhode Island	45	28	73
South Carolina	59	33	92
South Dakota	10	24	34
Tennessee	146	85	231
Texas	371	237	608
Utah	18	59	77
Vermont	6	36	42
Virginia	245	126	371
Virgin Islands	1	1	2
Washington	60	200	260
West Virginia	20	75	95
Wisconsin	130	141	271
Wyoming	4	26	30
Totals	7,315	7,925	15,240

Tables of the physicians licensed for 23 previous years and for 1958, by both examination and reciprocity or endorsement, are included in table 2. Beginning in 1936, there was a marked increase in the number of physicians licensed representing principally the licensure of foreign-trained physicians. The increases in 1946 and succeeding years were the result of the increase in the production of physicians by the medical schools of the United States and Canada, the licensure of foreign-trained physicians, and in the reciprocity and endorsement group the movement of physicians to other locations for practice. In the 24 years from 1935 to 1958, 282,486 medical licenses have been issued, 153,577 after written examination and 128,909 by endorsement of credentials.

Candidates Examined

In table 3 are recorded data referring to applicants for medical licensure by 53 licensing boards. For each board is given the number who passed and failed, the medical school of graduation, the percentage of failures for each school, as well as each licensing board, and the number of states in which graduates of a given school were examined. Approved medical schools in the United States that are no longer in existence, foreign faculties of medicine, unapproved medical schools, and schools of osteopathy are not listed by name, but the numbers examined in these three categories are included after those for existing medical schools in the United States and Canada.

Throughout the last calendar year 8,633 candidates were examined, of whom 7,268 passed and 1,365 failed. The candidates represented graduates of 78 existing approved medical schools of the United States, 11 approved medical schools of Canada, one approved medical school in the United States no longer in operation, 235 faculties of medicine or licensing corporations of other countries, 5 unapproved medical schools in the United States

Table 2.—*Licenses Issued, 1935-1958*

Year	Examination	Reciprocity and Endorsement	Total
1935	5,725	2,194	7,919
1936	6,276	2,773	9,049
1937	6,629	3,205	9,834
1938	6,557	2,956	9,513
1939	6,400	2,872	9,272
1940	6,289	2,866	9,155
1941	6,057	2,762	8,819
1942	6,152	2,469	8,621
1943	6,062	2,340	8,402
1944	7,080	2,596	9,676
1945	5,580	3,622	9,202
1946	6,567	9,669	16,236
1947	6,763	7,701	14,464
1948	5,997	7,595	13,592
1949	5,252	6,929	12,181
1950	5,454	6,755	12,209
1951	5,713	6,225	11,938
1952	6,212	7,016	13,228
1953	6,565	7,869	14,434
1954	6,827	8,202	15,029
1955	7,379	7,461	14,840
1956	7,122	7,421	14,543
1957	7,604	7,486	15,090
1958	7,315	7,925	15,240
Totals	153,577	128,909	282,486

TABLE 3.—*Candidates*

Marginal Number	SCHOOL	1 Alabama		2 Alaska		3 Arizona		4 Arkansas		5 California		6 Colorado		7 Connecticut		8 Delaware		9 District of Columbia		10 Florida		11 Georgia		12 Idaho		13 Illinois		14 Indiana		15 Iowa		16 Kansas		17 Kentucky		18 Louisiana		19 Maine		20 Maryland		21 Massachusetts	
		P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F
	ALABAMA																																										
1	Medical College of Alabama, Birmingham	68	0																	4	3																						
	ARKANSAS																																										
2	University of Arkansas School of Med., Little Rock							86	1											4	0															1	0						
	CALIFORNIA																																										
3	Coll. of Med. Evangelists, Loma Linda, Los Angeles					1	0			60	3	1	0							2	1	2	0																	3	0		
4	Univ. of California School of Med., Los Angeles									43	2																																
5	Univ. of So. California School of Med., Los Angeles									42	2																																
6	Stanford University School of Med., San Francisco									38	0									1	0					1	0																
7	Univ. of California School of Med., San Francisco									80	2									1	0																						
	COLORADO																																										
8	University of Colorado School of Medicine, Denver					2	0					51	0																	1	0					2	0					1	1
	CONNECTICUT																																										
9	Yale University School of Medicine, New Haven																			4	0					1	0																
	DISTRICT OF COLUMBIA																																										
10	Georgetown Univ. School of Med., Washington																	1	0	3	3							1	0							1	0			1	0		
11	George Washington Univ. School of Med., Wash.									1	0									4	2	2	0			1	0									4	0			3	0		
12	Howard Univ. College of Medicine, Washington									5	1											4	0			1	2	1	0					1	0	1	0			28	6		
	FLORIDA																																										
13	University of Miami School of Med., Coral Gables									1	0									52	4	6	0													2	0						
	GEORGIA																																										
14	Emory University School of Medicine, Emory Univ.													1	0					21	2	65	0																	1	0		
15	Medical College of Georgia, Augusta																			13	3	93	0																				
	ILLINOIS																																										
16	Chicago Medical School, Chicago									1	0									3	0							1	0							1	0						
17	Northwestern University Medical School, Chicago					1	0			13	0									8	2					32	3	6	0			1	0			2	0			1	0	0	1
18	Stritch School of Med. of Loyola Univ., Chicago									1	0	1	0							5	4					27	4	3	0							2	0			1	0		
19	Univ. of Chicago, The School of Medicine, Chicago									6	0			2	0					4	0	1	0			8	0	2	0							1	0					1	0
20	University of Illinois College of Medicine, Chicago									13	1	2	0	1	0					8	3					90	3	1	0											1	0	0	1
	INDIANA																																										
21	Indiana University School of Med., Indianapolis					2	0													10	4					5	0	137	2							1	0						
	IOWA																																										
22	State Univ. of Iowa College of Medicine, Iowa City					1	0			1	1	1	0							2	0									99	0												
	KANSAS																																										
23	Univ. of Kan. School of Med., Lawrence, Kan. City																	1	0	1	1					1	0					1	0			1	0						
	KENTUCKY																																										
24	University of Louisville School of Med., Louisville																			7	3													96	0								
	LOUISIANA																																										
25	Louisiana State Univ. School of Med., New Orleans																			2	2					1	0									95	0						
26	Tulane University of Louisiana School of Medicine, New Orleans	1	0									1	0							17	3															113	0						
	MARYLAND																																										
27	Johns Hopkins Univ. School of Med., Baltimore	1	0							1	1			1	0					3	0	1	0			1	0	1	0									2	0	48	1		
28	University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore									1	0									6	1					2	0													73	2		
	MASSACHUSETTS																																										
29	Boston University School of Medicine, Boston																			4	0															1	0	1	0				
30	Harvard Medical School, Boston									2	0	1	0	1	0					6	0	3	0			2	0									2	0	1	0	1	0	0	1
31	Tufts University School of Medicine, Boston																			3	4																						
	MICHIGAN																																										
32	University of Michigan Medical School, Ann Arbor																			12	6					3	0																
33	Wayne State University College of Med., Detroit																			5	0																						
	MINNESOTA																																										
34	University of Minnesota Med. School, Minneapolis									2	0									4	0													1	0							2	1
	MISSISSIPPI																																										
35	University of Mississippi School of Med., Jackson																			1	0																						
	MISSOURI																																										
36	University of Missouri School of Med., Columbia																			2	0																			0	1		
37	Saint Louis University School of Med., Saint Louis																			7	2					2	0																
38	Washington University School of Med., Saint Louis											1	0							6	1					2	0																
	NEBRASKA																																										
39	Creighton University School of Medicine, Omaha					2	0			3	0	1	0	1	0					1	1					1	0	1	0														
40	University of Nebraska College of Medicine, Omaha									2	0									4	0											1	0										
	NEW YORK																																										
41	Albany Med. College of Union University, Albany																			4	0																						
42	University of Buffalo School of Medicine, Buffalo																			7	4																						
43	Columbia University College of Physicians and Surgeons, New York City							1	0	2	0									6	2	2	0													2	0	1	0				
44	Cornell University Medical College, New York City	1	0							1	0									4	0	2	0																				
45	New York Medical College, Flower and Fifth Avenue Hospitals, New York City									2	0									7	2							1	0					1	0	4	0	1	0				
	Marginal Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21	

P—Passed; F—Failed

25 Missouri P F	26 Montana P F	27 Nebraska P F	28 Nevada P F	29 New Hampshire P F	30 New Jersey P F	31 New Mexico P F	32 New York P F	33 North Carolina P F	34 North Dakota P F	35 Ohio P F	36 Oklahoma P F	37 Oregon P F	38 Pennsylvania P F	39 Rhode Island P F	40 South Carolina P F	41 South Dakota P F	42 Tennessee P F	43 Texas P F	44 Utah P F	45 Vermont P F	46 Virginia P F	47 Washington P F	48 West Virginia P F	49 Wisconsin P F	50 Wyoming P F	51 Hawaii, Puerto Rico, and Virgin Islands P F	52 Totals	53 Examined—Passed	54 Examined—Failed	55 % Failed	56 No. of Boards Examined by	Marginal Number
																											95	72	3	4.0	2	1
																											92	91	1	1.1	3	2
										1 0								1 0									75	71	4	5.3	8	3
							1 0																			1 0	47	45	2	4.3	3	4
										1 0																1 0	46	44	2	4.3	3	5
																											40	40	0	0.0	3	6
													1 0													0 1	85	82	3	3.5	4	7
1 0																									1 0		64	63	1	1.6	8	8
								1 0					1 0									1 1					10	9	1	10.0	6	9
					3 0		3 1			2 1			3 0														24	19	5	20.8	10	10
							1 1	1 0					1 0					1 0			2 1						28	24	4	14.3	11	11
1 0							1 4	1 1					1 0	1 0													68	54	14	20.6	13	12
							2 0																				67	63	4	6.0	5	13
							5 0																1 0				96	94	2	2.1	6	14
																											109	106	3	2.8	2	15
																											6	6	0	0.0	4	16
1 1	1 0						4 1			1 0								1 0				3 0		1 0		1 0	104	96	8	7.7	20	17
					1 0				2 0	1 1														2 1			61	51	10	16.4	13	18
2 0							3 0	1 0	1 0	1 0			1 0										1 0	1 0			39	39	0	0.0	18	19
					1 0		2 1			2 0												2 0		3 0			142	133	9	6.3	14	20
										1 0										1 0							164	158	6	3.7	8	21
1 0									1 0																		109	108	1	0.9	8	22
24 0																									0 1	1 0	33	31	2	6.1	9	23
																											106	103	3	2.8	2	24
																											100	98	2	2.0	3	25
							1 0																1 0				147	144	3	2.0	8	26
													1 0								2 0					1 0	65	63	2	3.1	12	27
					1 0		2 0						1 0														90	87	3	3.3	8	28
1 0																		2 0									8	8	0	0.0	4	29
							1 1	2 0					1 0								0 1	2 1					33	30	3	9.1	17	30
																											8	3	5	62.5	2	31
										4 0		1 0															181	175	6	3.3	5	32
																											77	77	0	0.0	2	33
							1 0		1 0										1 0								120	119	1	0.8	8	34
																											45	45	0	0.0	2	35
33 0																											35	35	0	0.0	2	36
111 0							1 1						2 0									0 1				1 0	129	124	5	3.9	8	37
86 0							6 1																			2 0	106	104	2	1.9	7	38
1 0		34 0			1 0		1 0		1 0			0 1	1 0									2 1				1 0	60	57	3	5.0	18	39
		74 0														1 0							1 0				84	84	0	0.0	7	40
																											5	5	0	0.0	2	41
																		1 0									13	9	4	30.8	3	42
				1 0	1 0		5 2	4 0					1 0					2 0				1 1		1 0			36	31	5	13.9	15	43
					1 0		5 0	2 0		1 1		1 0						1 0									21	20	1	4.8	11	44
					1 0		0 1	1 0						1 0				1 0									23	20	3	13.1	11	45
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	

TABLE 3.—*Candidates Ex*

Marginal Number	SCHOOL	Alabama		Alaska		Arizona		Arkansas		California		Colorado		Connecticut		Delaware		District of Columbia		Florida		Georgia		Idaho		Illinois		Indiana		Iowa		Kansas		Kentucky		Louisiana		Maine		Maryland		Massachusetts	
	Marginal Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21	
		P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F
	NEW YORK—continued																																										
46	New York University Coll. of Med., New York City													0	1					12	0	1	0					1	0									1	0				
47	State University of New York, Downstate Medical Center, New York City											1	0			1	0			10	2	1	0					2	0							1	0						
48	Univ. of Rochester School of Med. and Dentistry											1	0					1	0	1	1													1	0	1	0						
49	State University of New York, Upstate Medical Center, Syracuse											1	0							4	1	1	0													2	0						
	NORTH CAROLINA																																										
50	University of North Carolina School of Medicine, Chapel Hill																					1	0													1	0						
51	Duke University School of Medicine, Durham	1	0									1	0							13	2	2	0													1	0			1	0		
52	Bowman Gray School of Medicine of Wake Forest College, Winston-Salem																			7	3					2	1																
	OHIO																																										
53	Univ. of Cincinnati College of Medicine, Cincinnati									1	0	1	0							5	2					1	0																
54	Western Reserve Univ. School of Med., Cleveland																			4	1					1	0									1	0						
55	Ohio State University College of Med., Columbus																			8	2															1	0						
	OKLAHOMA																																										
56	Univ. of Oklahoma School of Med., Oklahoma City									1	0			1	0					2	1					0	1									2	0						
	OREGON																																										
57	University of Oregon Medical School, Portland			2	0					5	0			1	0											1	0			1	0					1	0						
	PENNSYLVANIA																																										
58	Hahnemann Medical Coll. and Hosp. of Philadelphia									5	0									10	2					1	0							1	0					0	1		
59	Jefferson Med. Coll. of Philadelphia, Philadelphia									1	0	1	0	1	0	2	0			7	1																			4	0		
60	Temple University School of Medicine, Philadelphia			1	0					4	0					1	0			16	3					1	0	1	0							1	0			1	0		
61	Univ. of Pennsylvania School of Med., Philadelphia									3	0	1	0	1	0					9	0					2	0									1	0						
62	Woman's Med. Coll. of Pennsylvania, Philadelphia									2	1									1	1					1	0																
63	Univ. of Pittsburgh School of Med., Pittsburgh									4	0									8	0	1	0			2	0													1	0		
	PUERTO RICO																																										
64	Univ. of Puerto Rico School of Med., San Juan									1	0											1	0													1	0						
	SOUTH CAROLINA																																										
65	Medical College of South Carolina, Charleston			1	0															4	0					2	1																
	TENNESSEE																																										
66	University of Tennessee College of Med., Memphis									1	0									21	6	2	0			1	0							2	0								
67	Meharry Medical College, Nashville					1	0			4	0			1	0					1	0	52	0			2	1							1	0					2	2		
68	Vanderbilt University School of Medicine, Nashville									1	0									11	1																			1	0		
	TEXAS																																										
69	Univ. of Texas Southwestern Med. School, Dallas					1	0	1	0																											1	0						
70	University of Texas Medical Branch, Galveston					1	0																																				
71	Baylor University College of Medicine, Houston																															1	0			1	0						
	UTAH																																										
72	University of Utah School of Med., Salt Lake City					1	0			22	0													2	0	1	0			1	0											3	
	VERMONT																																										
73	University of Vermont College of Med., Burlington																			2	2																						
	VIRGINIA																																										
74	Univ. of Virginia School of Med., Charlottesville																			2	1	1	0																				
75	Medical College of Virginia, Richmond																			8	0					1	0	1	0							2	0			1	0		
	WASHINGTON																																										
76	University of Washington School of Med., Seattle									6	0							2	0			1	0			2	0									2	0						
	WISCONSIN																																										
77	University of Wisconsin Medical School, Madison									6	1															1	0	1	0							1	0						
78	Marquette University School of Med., Milwaukee					1	0			7	1	4	0							2	1					7	1									1	0			1	0		
	CANADA																																										
79	Univ. of Alberta Faculty of Medicine, Edmonton									8	0															1	0	3	0														
80	Univ. of British Columbia, Sch. of Med., Vancouver																																										
81	University of Manitoba Faculty of Med., Winnipeg									7	0																									1	0			1	0		
82	Dalhousie University Faculty of Medicine, Halifax									3	0			2	0																							1	0				
83	Queen's University Faculty of Medicine, Kingston									2	0			1	1					1	1															1	0						
84	Univ. of Western Ontario Faculty of Med., London					0	1			1	0			1	0					2	1																						
85	University of Ottawa Faculty of Medicine, Ottawa									0	1																											1	0	1	0	1	0
86	University of Toronto Faculty of Med., Toronto									3	0									2	0					1	0	1	0											2	0		
87	McGill University Faculty of Medicine, Montreal									6	0			1	0					2	0					1	0											1	0	1	0	1	0
88	University of Montreal Faculty of Med., Montreal									2	0																																
89	Laval University Faculty of Medicine, Quebec									3	0																											1	2				
90	Univ. of Saskatchewan College of Med., Saskatoon									2	0																																
	OTHERS																																										
91	Foreign Medical Faculties	2	0	1	0	3	0			98	65	1	0	136	58	3	2	15	0	14	14	8	0			160	278	8	1	2	0	1	0			1	0	26	9	114	66	21	
92	Extinct Approved Medical School																					1	0																			1	13
93	Unapproved Medical Schools																			1	2					0	1															0	1
94	Schools of Osteopathy																	1	0							6	4	6	0			16	0										
95		74		5		18		89		612		75		213		9		21		575		254		2		679		182		104		21		104		261		48		371		86	
96		74		5		17		88		530		75		153		7		21		461		254		2		379		179		104		21		104		261		37		292		31	
97		0		0		1		1		82		0		60		2		0		114		0		0		300		3		0		0		0		0		11		79		55	
98	Percentage Failed	0.0		0.0		5.6		1.1		13.4		0.0		28.2		22.2		0.0		19.8		0.0		0.0		44.2		1.6		0.0		0.0		0.0		0.0		22.9		21.3		64.0	
	Marginal Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21	

P—Passed; F—Failed

26 Montana		27 Nebraska		28 Nevada		29 New Hampshire		30 New Jersey		31 New Mexico		32 New York		33 North Carolina		34 North Dakota		35 Ohio		36 Oklahoma		37 Oregon		38 Pennsylvania		39 Rhode Island		40 South Carolina		41 South Dakota		42 Tennessee		43 Texas		44 Utah		45 Vermont		46 Virginia		47 Washington		48 West Virginia		49 Wisconsin		50 Wyoming		51 Hawaii, Puerto Rico, and Virgin Islands		52 Totals	53 Examined—Passed	54 Examined—Failed	55 % Failed	56 No. of Boards Examined by	Marginal Number
P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F						
								1	0			3	2																					2	0																	24	21	3	12.5	8	46
												1	0	1	0																			2	0																	22	20	2	9.1	9	47
												3	0	3	0									1	0									1	0																	18	17	1	5.6	10	48
																																																				9	8	1	11.1	4	49
														56	3									1	0																											62	59	3	4.8	4	50
												1	0	63	3													1	0					1	0																	97	92	5	5.2	11	51
														42	5	1	0																																			61	52	9	11.8	4	52
												0	1					75	0																																	86	83	3	3.5	6	53
												4	1					71	1																															3	0	87	84	3	3.5	6	54
												4	1					139	0																															1	0	157	154	3	1.9	6	55
												2	0							72	0			1	0																											84	82	2	2.4	9	56
										1	0					1	0					21	0	2	0																					1	0			1	0	43	43	0	0.0	13	57
1	0					1	0	12	0			1	1					2	0					65	0													2	0	1	0					2	0					108	104	4	3.7	14	58
								9	0			2	0					6	0					130	0																					1	0					167	166	1	0.6	12	59
								3	0			2	1	2	0			2	0					85	0					1	0									1	0			1	0	2	0					130	126	4	3.1	18	60
								1	0			4	1	3	0			2	0					58	0																									1	0	87	86	1	1.1	12	61
								2	0									4	0					18	0									2	0																	33	31	2	6.1	8	62
																		1	0					79	0					2	0			1	0																	90	90	0	0.0	9	63
												4	2																																					1	0	10	8	2	20.0	5	64
												1	0															57	0																							66	65	1	1.5	5	65
												1	0	2	0	1	0															104	0																			191	185	6	3.1	10	66
								1	0			3	6					1	1									1	0																							94	84	10	10.6	15	67
												1	0			1	0							1	0							41	0											1	0					0	1	62	60	2	3.3	11	68
		1	0													1	0																	85	2																	92	90	2	2.2	6	69
																																		146	1																	148	147	1	0.7	2	70
												1	0											1	0									74	1																	79	78	1	1.3	5	71
1	0	1	0															1	0					1	0									1	0	16	0					2	0					1	0	2	0	59	59	0	0.0	17	72
																								1	0													1	0							1	0					10	8	2	20.0	4	73
												1	1																											65	4											75	69	6	8.0	4	74
								1	0					1	0									2	0															77	11			10	0							115	104	11	9.6	10	75
1	0																					1	0									1	0			1	0					34	11			1	0	1	0			70	59	11	15.7	13	76
												1	0					1	0					3	0																	1	0			59	0					77	76	1	1.3	11	77
								1	0			1	1									1	0											1	0											55	0					94	90	4	4.3	14	78
																								1	0															0	1											19	18	1	5.3	7	79
																																																				0	0	0	0.0	0	80
				2	0	1	0									3	1	1	0			1	0	2	0																											28	27	1	3.6	12	81
														2	0									2	0									1	0																	13	13	0	0.0	7	82
														1	0									1	0																					2	0					14	12	2	14.3	10	83
						1	0					0	1	1	0			3	0					2	1																											18	14	4	22.2	10	84
												1	0					1	0															1	0											1	0					9	8	1	11.1	9	85
												2	1	0	1			1	0					3	0									1	0					1	0									1	0	26	24	2	7.7	16	86
						1	0					1	0					1	0					2	0	1	0													1	0	0	1			1	0					26	25	1	3.8	17	87
						1	0					1	0																																							5	5	0	0.0	4	88
												1	0																																							8	6	2	25.0	4	89
																																																				2	2	0	0.0	1	90
		1	0	1	0	1	0	111	24	2	0	352	262	1	4	1	1	71	95			1	0	35	0	42	1			1	0			35	10					95	94	12	6	4	0	14	1	1	0	71	19	2,567	1,518	1,049	40.9	42	91
																																																				1	1	0	0.0	1	92
												2	3											2	0																											25	6	19	76.0	5	93
						1	0	2	0			35	19					66	15															5	1											2	0					180	140	40	22.2	11	94
4		111		3		8		178		3		802		214		17		579		72		31		518		46		59		5		146		387		18		7		357		83		20		155		5		111		8,633			15.8		95
4		111		3		8		154		3		484		197		15		464		72		30		517		45		59		5		146		372		18		7		245		60		20		153		4		90			7,268				96
0		0		0		0		24		0		318		17		2		115		0		1		1		1		0		0		0		15		0		0		112		23		0		2		1		21				1,365			97
0.0		0.0		0.0		0.0		13.5		0.0		39.7		7.9		11.8		19.9		0.0		3.2		0.2		2.2		0.0		0.0		0.0		3.9		0.0		0.0		31.4		27.7		0.0		1.3		20.0		18.9					15.8		98
26		27		28		29		30		31		32		33		34		35		36		37		38		39		40		41		42		43		44		45		46		47		48		49		50		51		52	53	54	55	56	

that are no longer in operation, and 8 schools of osteopaths. Osteopaths who were granted the legal right to practice medicine, surgery, or both, by the medical examining boards, are included in these statistics. Osteopaths in other states who were granted the privilege of special practice by other than medical examining boards are excluded from these compilations.

Examination and reciprocity meetings are scheduled at frequent intervals by licensing boards in most of the states to facilitate licensure and to enable physicians to commence practice without undue delay. Later in this study a tabulation is included giving the schedules for all states. The publication of the dates for examinations and reciprocity or endorsement meetings is a regular biweekly feature of THE JOURNAL.

Represented among the 8,633 examinees were 5,692 graduates of approved medical schools in the United States, of whom 4.3% failed; 168 graduates of approved schools in Canada with 8.3% failures; 1 graduate from an approved medical school no longer in operation who passed; 2,567 graduates of faculties located in countries other than the United States and Canada, 40.9% of whom failed; 25 graduates of unapproved medical schools at one time in existence in the United States, with 76.0% failures; and 180 graduates of schools of osteopathy with 22.2% failures.

As in table 1, the 8,633 examinees do not represent an equal number of persons, since a candidate tested in more than one state in a calendar year is counted in each state. If a candidate failed more than once in a given state within the year, however, he is counted in that state as an individual or a single failure. Figures that show the number of individual licentiates added to the medical profession in 1958 are given in tables 11, 12, and 13.

The University of Tennessee, a state university, had the greatest number of graduates for any one school examined for medical licensure in 1958. There were 191 graduates examined, of whom 104 were tested in Tennessee and 87 in nine other states. The greatest number examined from a private school was 167 representing Jefferson Medical College; they were tested in 12 states, with 130 being tested in Tennessee. Eleven public and eight private medical schools each had more than 100 of their graduates examined for medical licensure in 1958, as follows:

Public Medical Schools	No. of Examinees	No. of States in Which Examinations Were Taken
Medical College of Georgia	109	2
University of Illinois	142	14
Indiana University	164	8
State University of Iowa	109	8
Louisiana State University	100	3
University of Michigan	181	5
University of Minnesota	120	8
Ohio State University	157	6
University of Tennessee	191	10
University of Texas	148	2
Medical College of Virginia	115	10

Private Medical Schools	No. of Examinees	No. of States in Which Examinations Were Taken
Northwestern University	104	20
University of Louisville	106	2
Tulane University	147	8
St. Louis University	129	8
Washington University	106	7
Hahnemann, Philadelphia	108	14
Jefferson Medical College	167	12
Temple University	130	18

The Albany Medical College, with five examinees, had the fewest applicants for medical licensure by written examination before state boards. Five other medical schools were represented with fewer than 10 graduates—Yale, Chicago Medical, Boston, Tufts, and Syracuse. The majority of the graduates of these schools are licensed by endorsement of the certificate of the National Board of Medical Examiners.

There were 168 graduates of 11 of the approved medical schools in Canada tested for medical licensure in 1958 in 27 states and Hawaii. The figures are given for each licensing board by school in table 3 and the numbers examined in each state in table 4. Of the 168 candidates examined, 154 passed and 14, or 8.3%, failed. The University of British Columbia, an approved medical school, had no graduates appearing before state boards. The University of Saskatchewan graduated its first class of students in 1957, but none appeared for licensure in the United States in that year. In 1958, however, there were two examined and both passed.

One graduate of Rush Medical College, an approved school no longer in operation, was examined in Georgia, and passed. All other graduates of approved medical schools represented in table 3 were from existing institutions. Graduates of five unapproved medical schools were examined in five states. The schools represented in this group are no longer in operation in the United States. There were 25 examinees in this category, of whom 6 passed and 19, 76%, failed. Of 180 graduates of eight osteopathic schools examined in 11 states, 140 passed and 40, 22.2%, failed. Graduates of 235 foreign faculties of medicine were examined by 42 states. There were 2,567 such graduates, with 1,518 successful examinations, and 1,049, or 40.9%, failures.

Totals for the six categories are given in table 5. It will be noted that 4.3% of the graduates of existing approved medical schools in the United States and 8.3% of the graduates of approved Canadian schools failed. The greatest number of failures fell within three groups: foreign faculties of medicine, unapproved medical schools, and schools of osteopathy. Those in these three groups registered by medical boards are separately discussed in later tables.

Consolidated Results of Examinations

The combined results of two groups of examinations, the state medical board examinations and part 3 of the examinations of the National Board of

Medical Examiners, are given in table 6. This table represents a comprehensive analysis of the performance of physicians from individual schools. It will be noted that in some instances schools having failures before state licensing boards had few, if any, failures before the National Board.

In 1958 there were 5,692 graduates of approved medical schools in the United States examined by state boards and of whom 4.3% (243) failed. In the same calendar year 1,951 graduates of these schools were tested in the final examination of the National Board and 12 failed. In both groups, a total of 7,643 were examined, of whom 7,388 passed and 255, or 3.3%, failed.

Of the graduates of Canadian medical schools, 8.3% failed state board examinations while there were no failures among the 63 graduates who were tested by the National Board. Only 9 graduates of foreign medical schools were examined by the National Board, and 2,567 were examined by state boards. One graduate of an approved medical school no longer in existence was examined by a state board, and the National Board also had one such graduate who was certified. There were none examined by the National Board in the approved medical school or osteopathic categories. There is no comparison to be made in the three groups last mentioned.

TABLE 4.—*Graduates of Medical Schools in Canada Examined for Licensure in the United States, 1958*

	Examined	Passed	Failed
Arizona	1	0	1
California	38	37	1
Connecticut	6	5	1
Florida	9	7	2
Hawaii	1	1	0
Illinois	3	3	0
Indiana	4	4	0
Louisiana	2	2	0
Maine	6	4	2
Maryland	5	5	0
Massachusetts	2	2	0
Michigan	8	8	0
Minnesota	22	22	0
Mississippi	2	2	0
Missouri	2	2	0
Nevada	2	2	0
New Hampshire	4	4	0
New York	8	6	2
North Carolina	5	4	1
North Dakota	4	3	1
Ohio	7	7	0
Oregon	1	1	0
Pennsylvania	14	13	1
Rhode Island	1	1	0
Texas	3	3	0
Virginia	3	2	1
Washington	1	0	1
Wisconsin	4	4	0
Totals	168	154	14

The total of all candidates examined by state boards was 8,633, of whom 7,268 passed and 1,365, 15.8%, failed. For both groups, state boards and the National Board, there were a total of 10,656 examined, with 9,279 successful candidates, and 1,377 failures, or 12.9%. Including the National Board figures reduces the over-all percentage of failures by about 3%.

Failures in Medical Licensure Examinations

Licensure failures in 1958 before state medical licensing boards are further analyzed in table 7. In this tabulation is given the number examined in each state, the number who passed and failed, and the percentage of failures.

The following 12 approved schools in the United States had no failures among their graduates in medical licensing examinations last year:

	Number of Graduates Examined	No. of States in which Examinations Were Taken
Stanford University	40	3
Chicago Medical School	6	4
University of Chicago	39	18
Boston University	8	4
Wayne State University	77	2
University of Mississippi	45	2
University of Missouri	35	2
University of Nebraska	84	7
Albany Medical College	5	2
University of Oregon	43	13
University of Pittsburgh	99	9
University of Utah	59	17

It will be noted, referring to table 3, that those states with high percentages of failures examine a considerable number of foreign-trained physicians. The one exception is Florida. This state has no provisions for medical licensure by reciprocal or endorsement registration, and physicians planning semiretirement in a more ideal climate seek licensure in this state. Many of these physicians graduated from medical schools in the early years of the century and experience difficulty in writing examinations.

In general, state licensing boards require the applicant to receive an over-all average of 75%, and at least 60% in any one subject in the written examination in order to qualify for registration. In case of failure in not more than two subjects, in some states the applicant is permitted a second examination within 12 months. A few states consider such persons as conditioned in the subjects in which they fail. Conditioned candidates are not counted as failures in these statistics. When their grades are raised after a successful examination, they are recorded among those who passed.

TABLE 5.—*Source of Candidates Examined for Licensure in the United States, 1958*

Medical Schools	No. of Schools	No. Examined	No. Passed	No. Failed	% Failed
Approved schools in United States	78	5,692	5,449	243	4.3
Approved in Canada	11	168	154	14	8.3
Extinct	1	1	1	0	0.0
Foreign	235	2,567	1,518	1,049	40.9
Unapproved schools	5	25	6	19	76.0
Schools of osteopathy	8	180	140	40	22.2
Totals		8,633	7,268	1,365	15.8

Of the 15,240 persons obtaining licenses in 1958, 258 failed state board tests before obtaining a license. Of these, 124 had one failure, 59 had two failures, 32 had three failures, and 43 had four or

TABLE 6.—*Combined Results of Examinations of State Boards and the National Board of Medical Examiners, 1958*

School	Results by Medical Examining Board Tests		Part 3 Examination of National Board of Medical Examiners		Total Examined	Totals		% Failed
	P	F	P	F		P	F	
Medical College of Alabama	72	3	2	..	77	74	3	3.9
University of Arkansas	91	1	3	..	95	94	1	1.1
College of Medical Evangelists	71	4	39	..	114	110	4	3.5
University of California, Los Angeles	45	2	1	..	48	46	2	4.2
University of Southern California	44	2	1	..	47	45	2	4.3
Stanford University	40	0	21	..	61	61	0	0.0
University of California, San Francisco	82	3	1	..	86	83	3	3.5
University of Colorado	63	1	3	..	67	66	1	1.5
Yale University	9	1	75	..	85	84	1	1.2
Georgetown University	19	5	81	1	106	100	6	5.7
George Washington University	24	4	78	..	106	102	4	3.8
Howard University	54	14	5	..	73	59	14	19.2
University of Miami	63	4	12	..	79	75	4	5.3
Emory University	94	2	2	..	98	96	2	2.0
Medical	106	3	0	..	109	106	3	2.8
Chicago	6	0	66	2	74	72	2	2.8
Northwe....	96	8	56	..	160	152	8	5.0
Stritch School of Medicine	51	10	43	2	106	94	12	11.3
University of Chicago	39	0	45	..	84	84	0	0.0
University of Illinois	133	9	18	..	160	151	9	5.6
Indiana University	158	6	0	..	164	158	6	3.7
State University of Iowa	108	1	3	..	112	111	1	0.9
University of Kansas	31	2	15	..	48	46	2	4.2
University of Louisville	103	3	8	..	114	111	3	2.6
Louisiana State University	98	2	0	..	100	98	2	2.0
Tulane University	144	3	2	..	149	146	3	2.0
Johns Hopkins University	63	2	8	..	73	71	2	2.7
University of Maryland	87	3	4	..	94	91	3	3.2
Boston University	8	0	68	..	76	76	0	0.0
Harvard Medical School	30	3	111	1	145	141	4	2.8
Tufts College Medical School	3	5	115	1	124	118	6	4.8
University of Michigan	175	6	4	..	185	179	6	3.2
Wayne University	77	0	1	..	78	78	0	0.0
University of Minnesota	119	1	1	..	121	120	1	0.8
University of Mississippi	45	0	0	..	45	45	0	0.0
University of Missouri	35	0	3	..	38	38	0	0.0
St. Louis University	124	5	8	..	137	132	5	3.6
Washington University	104	2	10	1	117	114	3	2.6
Creighton University	57	3	27	..	87	84	3	3.4
University of Nebraska	84	0	3	1	88	87	1	1.1
Albany Medical College	5	0	49	..	54	54	0	0.0
University of Buffalo	9	4	66	1	80	75	5	6.3
Columbia University	31	5	107	..	143	138	5	3.5
Cornell University	20	1	76	..	97	96	1	1.0
[illegible]	20	3	98	..	121	118	3	2.5
[illegible]	21	3	113	..	137	134	3	2.2
[illegible]	20	2	145	1	168	165	3	1.8
University of [illegible]	17	1	58	..	76	75	1	1.3
[illegible]	8	1	60	..	69	68	1	1.4
[illegible]	59	3	0	..	62	59	3	4.8
[illegible]	92	5	7	..	104	99	5	4.8
[illegible]	52	9	0	..	61	52	9	14.8
[illegible]	83	3	0	..	86	83	3	3.5
[illegible]	84	3	41	..	128	125	3	2.3
Ohio State University	154	3	1	..	158	155	3	1.9
University of Oklahoma	82	2	0	..	84	82	2	2.3
University of Oregon	43	0	17	..	60	60	0	0.0
Hahnemann Medical College	104	4	9	..	117	113	4	3.4
Jefferson Medical College	166	1	11	..	178	177	1	0.6
Temple University	126	4	8	..	138	134	4	2.9
University of Pennsylvania	86	1	33	..	120	119	1	0.8
[illegible]	31	2	18	..	51	49	2	3.9
[illegible]	99	0	2	..	101	101	0	0.0
[illegible]	8	2	23	..	33	31	2	6.1
[illegible]	65	1	0	..	66	65	1	1.5
[illegible]	185	6	1	..	192	186	6	3.1
[illegible]	84	10	0	..	94	84	10	10.6
[illegible]	60	2	3	..	65	63	2	3.1
[illegible]	90	2	0	..	92	90	2	2.2
[illegible]	147	1	1	..	149	148	1	0.7
[illegible]	78	1	0	..	79	78	1	1.3
[illegible]	59	0	1	1	61	60	1	1.6
[illegible]	8	2	30	..	40	38	2	5.0
[illegible]	69	6	0	..	75	69	6	8.0
[illegible]	104	11	4	..	119	108	11	9.2
[illegible]	59	11	6	..	76	65	11	14.5
University of [illegible]	76	1	2	..	79	78	1	1.3
Marquette University	90	4	6	..	100	96	4	4.0
Subtotals: U. S. Schools	5,449	243	1,939	12	7,643	7,388	255	3.3
[illegible]	18	1	1	..	20	19	1	5.0
[illegible]	0	0	2	..	2	2	0	0.0
[illegible]	27	1	3	..	31	30	1	3.2
[illegible]	13	0	1	..	14	14	0	0.0
[illegible]	12	2	3	..	17	15	2	11.8
[illegible]	14	4	2	..	20	16	4	20.0
[illegible]	8	1	9	..	18	17	1	5.6
[illegible]	24	2	2	..	28	26	2	7.1
[illegible]	25	1	40	..	66	65	1	1.5
[illegible]	5	0	0	..	5	5	0	0.0
[illegible]	6	2	0	..	8	6	2	25.0
University of [illegible]	2	0	0	..	2	2	0	0.0
Subtotals: Canadian Schools	154	14	63	..	231	217	14	2.3
Foreign Medical Faculties	1,518	1,049	8	..	2,575	1,526	1,049	40.7
Extinct approved Medical School	1	0	1	..	2	2	0	0.0
Unapproved Medical Schools	6	19	0	..	25	6	19	76.0
Osteopathic Schools	140	40	0	..	180	140	40	22.6
Subtotals Others	1,665	1,108	9	..	2,782	1,674	1,108	27.9
Totals	7,268	1,365	2,011	12	10,656	9,279	1,377	12.9

more failures. Twenty-seven physicians failed from 5 to 10 tests before securing licenses. One physician failed 12 tests and another failed 19 tests before achieving success; both of these were foreign-trained individuals. Of all physicians licensed after one or more failures, 258 were foreign-trained and 17 were graduates of medical schools in the United States.

Registration by Reciprocity and Endorsement

A summary of the reciprocity and endorsement policies pertaining to medical licensure is included in table 8. One state, Florida, requires all applicants for medical licensure to pass a written examination. Hawaii and the Virgin Islands do not have reciprocal relations with any state, but Hawaii will endorse physicians certified by the National Board of Medical Examiners. Twenty-two boards require applicants for licensure to obtain a certificate from the board of examiners in the basic sciences of the state. In the section of this report pertaining to basic science boards is included a table outlining the reciprocity, endorsement, exemption, or waiver policies of the basic science boards.

Twenty-nine states, Alaska, and Puerto Rico have reciprocal agreements with specific states. In 19 states, the Canal Zone, and Guam, reciprocity is extended at the discretion of the licensing board. Twenty states, which have reciprocal agreements, also have similar discretionary powers to endorse applicants from nonreciprocating states who present credentials that correspond with those required by their respective states in the year issued. Also in this table is a column indicating the recognition accorded the certificate of the National Board of Medical Examiners.

Additional requirements, including professional practice, citizenship, oral examination, internship, and the fee for a license by reciprocity or endorsement are also recorded. In some states, physicians of Canadian birth are exempted from the citizenship requirement. This is indicated by footnote and is also represented in a later table pertaining to the acceptance of Canadian credentials. Few states will accept graduates of foreign faculties of medicine on a reciprocal basis. Again, details of the requirements of each state for foreign-trained physicians will be found later in this report. Other requirements or exemptions are indicated by footnotes; footnote numbers are referred to in the column headed "Miscellaneous."

This chart is intended to present an over-all picture of the reciprocity and endorsement policies of the licensing boards. It is helpful to physicians who are considering a change in location. The facts recorded, however, are intended to present merely statements of licensure policies. The information here given should be supplemented by direct communication with the licensing boards. A list of the executive officers in charge of medical licensure appears elsewhere in this report.

The procedure in issuing licenses by reciprocity or endorsement varies. Some states consider applications for licensure at any time, while others hold monthly, quarterly, or semiannual meetings. The policy in effect in each state is presented in a later table. In addition, The Journal publishes biweekly the exact dates when applications are considered.

In table 9 are presented data pertaining to the credentials accepted as the basis for licenses granted without written examination in 1958. There were 7,925 so registered on the basis of licenses issued by other states, the certificate of the National Board of Medical Examiners, by special exemption, and by acceptance of service with an agency of the government of the United States. California issued the greatest number of licenses by this method. In this state, 1,656 were registered. New York licensed 1,154. Eight other states licensed more than 200—Connecticut 221, Massachusetts 379, New Jersey 340, Ohio 345, Pennsylvania 241, Texas 237, and Washington 200.

Table 7.—*Failures in Medical Licensure Examinations, 1958*

State in Which Examined	No. Examined	No. Passed	No. Failed	% Failures
Alabama	74	74	0	0.0
Alaska	5	5	0	0.0
Arizona	18	17	1	5.6
Arkansas	89	88	1	1.1
California	612	530	82	13.4
Colorado	75	75	0	0.0
Connecticut	213	153	60	28.2
Delaware	9	7	2	22.2
District of Columbia	21	21	0	0.0
Florida	575	461	114	19.8
Georgia	254	254	0	0.0
Hawaii	36	*29*	7	*19.4*
Idaho	2	2	0	0.0
Illinois	679	379	300	44.2
Indiana	182	179	3	1.6
Iowa	104	104	0	0.0
Kansas	21	21	0	0.0
Kentucky	104	104	0	0.0
Louisiana	261	261	0	0.0
Maine	48	37	11	22.9
Maryland	371	292	79	21.3
Massachusetts	86	31	55	64.0
Michigan	287	287	0	0.0
Minnesota	200	200	0	0.0
Mississippi	124	124	0	0.0
Missouri	280	276	4	1.4
Montana	4	4	0	0.0
Nebraska	111	111	0	0.0
Nevada	3	3	0	0.0
New Hampshire	8	8	0	0.0
New Jersey	178	154	24	13.5
New Mexico	3	3	0	0.0
New York	802	484	318	39.7
North Carolina	214	197	17	7.9
North Dakota	17	15	2	11.8
Ohio	575	464	115	19.9
Oklahoma	72	72	0	0.0
Oregon	31	30	1	3.2
Pennsylvania	518	517	1	0.2
Puerto Rico	74	60	14	18.9
Rhode Island	46	45	1	2.2
South Carolina	59	59	0	0.0
South Dakota	5	5	0	0.0
Tennessee	146	146	0	0.0
Texas	387	372	15	3.9
Utah	18	18	0	0.0
Vermont	7	7	0	0.0
Virgin Islands	1	1	0	0.0
Virginia	357	245	112	31.4
Washington	83	60	23	27.7
West Virginia	20	20	0	0.0
Wisconsin	155	153	2	1.3
Wyoming	5	4	1	20.0
Totals	8,633	7,268	1,365	15.8

TABLE 8.—*Reciprocity and Endorsement*

Marginal Number	The Examining Board of	Reciprocates with, or Endorses Certificates Granted by																														Marginal Number
		Alabama	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	Dist. of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	
1	Alabama	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1
2	Alaska	+	..	+	+	+	+	..	+	..	..	..	..	+	..	+	+	..	..	+	..	+	+	+	+	..	..	+	+	+	..	2
3	Arizona	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3
4	Arkansas	+	+	..	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	4
5	California	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5
6	Canal Zone	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6
7	Colorado	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7
8	Connecticut	..	..	..	..	..	..	..	+	..	..	+	+	+	..	+	..	+	+	+	+	+	..	..	..	..	..	..	+	..	..	8
9	Delaware	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	9
10	District of Columbia	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10
11	Florida	No reciprocity or endorsement policies											..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11
12	Georgia	+	..	+	+	+	..	..	+	..	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	12
13	Guam	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	13
14	Hawaii	No reciprocal relations						..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	14
15	Idaho	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	15
16	Illinois	+	..	+	+	+	+	..	..	..	+	..	..	+	+	+	+	+	..	+	..	+	+	+	+	..	+	+	..	+	..	16
17	Indiana	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	17
18	Iowa	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	18
19	Kansas	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	19
20	Kentucky	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	20
21	Louisiana	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	21
22	Maine	..	+	+	+	+	+	+	+	..	+	..	..	+	+	+	+	+	..	..	+	+	+	+	+	+	+	+	+	+	+	22
23	Maryland	+	..	+	+	..	+	+	+	..	+	+	+	+	+	+	+	+	..	..	+	+	+	+	+	+	+	+	+	+	+	23
24	Massachusetts	+	..	..	+	..	+	+	+	..	+	+	..	+	+	+	+	+	+	+	..	..	..	+	+	+	+	..	+	+	..	24
25	Michigan	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	25
26	Minnesota	+	+[11]	+	+	+[11]	+[11]	+	+	..	+	+[11]	+	+[11]	+	+[11]	+[11]	+	+	+	..	+	..	+	+	+	+	+	+[11]	+	+	26
27	Mississippi	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	27
28	Missouri	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	28
29	Montana	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	29
30	Nebraska	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	..	30
31	Nevada	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	31
32	New Hampshire	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	32
33	New Jersey	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	33
34	New Mexico	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	34
35	New York	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	35
36	North Carolina	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	36
37	North Dakota	+	..	+	+	+	..	+	..	..	+	+	+	+	+	+	+	+	+	..	..	+	+	..	+	+	+	+	+	+	+	37
38	Ohio	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	38
39	Oklahoma	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	39
40	Oregon	+	+	+	+	+	+	+	..	..	+	+	+	+	+	..	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	40
41	Pennsylvania	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	41
42	Puerto Rico	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	+	..	+	..	..	..	..	42
43	Rhode Island	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	43
44	South Carolina	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	44
45	South Dakota	+	+	+	+	+	..	+	+	..	+	+	+	+	+	+	+	+	+	..	..	+	+	+	+	+	+	+	..	+	+	45
46	Tennessee	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	46
47	Texas	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	47
48	Utah	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	48
49	Vermont	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	49
50	Virginia	+	+	+	+	+	+	+	+	[13]	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	50
51	Virgin Islands	No reciprocal relations						..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	51
52	Washington	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	52
53	West Virginia	+	..	+	[20]	[20]	+	+	+	..	+	..	+	[20]	[20]	[20]	[20]	+	+	+	[20]	+	+	+	+	+	+	+	..	+	..	53
54	Wisconsin	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	54
55	Wyoming	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	55

This summary should be supplemented by direct communication with the secretary of

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Some states have additional requirements for graduates of schools outside the United States and Canada.

+ indicates reciprocal or endorsement relationships have been established; .. indicates no reciprocal or endorsement relationships have been established. (See column—"At the discretion of the board.")

1. D. Declaration of Intention of citizenship. ⊕ in citizenship column indicates full citizenship required; in other columns it implies a requirement.

2. In most cases there is a small additional recording or registration fee.

3. Year of required.

4. Internsh e year's practice.

5. Two years professional practice required.

6. All applicants must be graduates of a medical school approved by the American Medical Association.

7. Just preceding application.

8. Not required if applicant has been in practice more than 5 years.

9. Basic science certificate required either by reciprocity or examination in addition to basic science subjects of National Board.

10. Canadian citizens are required to file first papers.

11. Not applicable to citizens of Canada.

12. Oral examination required when application is based on a license dated five or more years prior to filing application.

13. For reciprocity applicants.

14. Oral examination required.

15. Endorsement of National Board of Medical Examiners, $35.

16. Active practice for a period of not less than three years immediately preceding date of application.

17. Practical clinical examination required.

18. In lieu of its own examination, certificate of National Board may be accepted in whole or in part.

19. Minimum fee.

20. Licentiates of California, Colorado, Indiana, Iowa, Kansas, Massachusetts, New York, and Rhode Island accepted on reciprocal basis at discretion of board.

21. Not required if country in which applicant is licensed will admit to practice citizens of the United States licensed to practice in some state or on proof of requirements similar to those required by California for graduates of foreign medical schools.

22. At discretion of Health Director.

The largest number of candidates presenting the same type of credential were 3,215 diplomates certified by the National Board of Medical Examiners. There were 345 licenses issued in Pennsylvania, 296 in Illinois, 295 in Missouri, 268 in Michigan, 251 in Ohio, and 219 in New York that were presented to other states for reciprocal registration. California, which issued the greatest number of licenses by reciprocity or endorsement (1,656) certified only 173 of its licentiates to other states. Figures in other states were fewer than 200. Forty-one medical officers of one of the federal services received licenses by endorsement of military credentials in six states. Eleven were licensed by six boards on the basis of a license issued in the Canal Zone, Hawaii, or Puerto Rico. None were regis-

Policies of Medical Licensing Boards

	Reciprocates with, or Endorses Certificates Granted by																						Requirements							
Marginal Number	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Alaska	Puerto Rico	At the Discretion of the Board	National Board of Medical Examiners	Basic Science Certificate	Internship	Professional Practice	Citizenship[1]	Fees, Dollars[6]	Miscellaneous	Marginal Number
1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	1[4]	⊕[11]	50	42	1
2	..	+	+	+	+	+	..	..	..	..	+	+	+	+	+	+	+	+	..	..	..	..	+	⊕	⊕	0	⊕	110	6	2
3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	⊕	⊕	1[10]	D	100	43	3
4	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	..	⊕	..	1[4]	⊕	100	38	4
5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[25]	..	⊕	0	⊕[21]	100	12	5
6	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[22]	..	⊕	2	..	5	..	6
7	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[9]	⊕	⊕	..	⊕	50	42	7
8	..	..	..	+	..	..	+	+	..	..	+	+	..	+	..	..	+	..	..	..	..	+	+	⊕[8]	..	3[10]	D[10]	75	42	8
9	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[5]	..	⊕	2	⊕	100	47	9
10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+[27]	⊕[32]	⊕	1[5]	..	50	..	10
11	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	⊕	..	..	⊕	..	..	11
12	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	+	..	+[38]	..	..	0	⊕	50	..	12
13	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	0	..	50	40, 6	13
14	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	⊕	..	⊕	50	42, 6	14
15	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	..	⊕	100	..	15
16	..	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	..	..	..[17]	..	⊕	1	D	200	17, 42	16
17	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	1[4]	..	100	..	17
18	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	⊕	⊕	1[4]	D	50	32, 6	18
19	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	⊕	⊕	1[4, 7]	⊕	25	28, 42	19
20	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	..	⊕	75	42	20
21	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	..	..	..	⊕	1[4]	⊕[10, 40]	50[28]	42	21
22	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	..	..	..	+	..	⊕	1[4]	⊕	52	..	22
23	+	+	..	+	+	+	+	+	+	..	+	+	..	+	+	..	+	+	..	+	+	+	+	..	..	1[4]	D	100	42	23
24	+	+	..	+	+	..	+	+	+	..	+	+	+	+	+	..	+	+	..	..	..	+	+	..	..	0	D	50	..	24
25	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	⊕[37]	⊕	1[4]	⊕	100	34	25
26	+[41]	+	..	+[41]	+	+	+	+[41]	..	+	+	+	..	+	+	+	+	+	+	+	..	+	+	⊕	..	0	⊕	100	11, 17, 42	26
27	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	..	..	..	D[14]	50	..	27
28	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+[27]	..	⊕[33]	1[4]	⊕	100	42	28
29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	..	1[4]	⊕	75	14, 42	29
30	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	⊕	..	1[4]	⊕	50[28]	..	30
31	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	+	⊕	⊕	1[4]	⊕	200	14, 42	31
32	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	0	⊕[11]	50	..	32
33	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	+	+	..	⊕	0	⊕	100	..	33
34	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	⊕	..	1[4]	D	50	..	34
35	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	..	2	D	10	..	35
36	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	+	..	..	..	0	⊕	100	29, 6	36
37	..	+	..	+	+	+	+	..	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	..	⊕	1	D[11]	50	14, 42	37
38	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	..	..	1	⊕	50	..	38
39	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	⊕[32]	⊕	1[4]	⊕	100	6	39
40	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+[9, 27]	⊕	⊕	..	D	100	6, 42	40
41	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	2[24]	D	50	42	41
42	..	..	+	..	..	..	..	..	+	..	..	..	..	..	..	..	..	+	..	..	..	+[3, 39]	+	..	⊕	1[3]	⊕	30	..	42
43	..	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	+	+	+	..	+[14]	+[14]	⊕	⊕	0	D	20	14	43
44	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	⊕	1[4]	⊕	100	42	44
45	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	+	..	..	..	+	⊕	⊕	1	D	50	..	45
46	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	+	+	+	+	..	..	+	+[30]	⊕	..	0	⊕	50	42	46
47	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	⊕	..	0	D	100	42	47
48	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	..	+	+	..	⊕	[31]	..	50	42	48
49	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	⊕	1[4]	⊕	50	11	49
50	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+	..	..	+[30]	+	..	..	2[26]	D	100	42	50
51	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	⊕	..	..	65	42	51
52	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	⊕	⊕	0	..	50	..	52
43	20	+	+	+	+	+	+	20	+	+	+	+	+	+	+	..	..	+	+	+	+	..	+	..	⊕	0	⊕	100	..	53
54	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	..	+	+	+	+[14]	+[18]	⊕	⊕	..	D	100[9]	6	54
55	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+[14]	+[14]	..	⊕	0	⊕	50	..	55

the licensing board of the state in which the physician is interested. See page 604.

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23. Oral examination required if applicant's state requires it.
24. If the applicant passes the examination in the state from which he transfers after the completion of his internship, no practice is required.
25. May require oral examination.
26. Internship accepted at the discretion of the board as the equivalent of two years' practice.
27. Fee, $25.
28. Fee same as applicant's state charges but not less than $50.
29. Graduates of foreign medical schools are accepted at the discretion of the board.
30. Diplomates of National Board not required to have been in practice for three years.
31. Same as required of candidates of state applying for licensure.
32. Not required for licensure by reciprocity.
33. Reciprocity applicants only.
34. Supplemental examination required in certain cases when accepting the examination of a state with whom reciprocal relations have not been established.
35. Applicants issued certificates prior to October, 1953, acceptable.
36. Fee same as applicant's state charges but not less than $75.
37. For matriculants after Oct. 15, 1937.
38. Graduates of foreign schools not accepted.
39. Reciprocity extended at discretion of board to candidates whose qualifications would entitle them to admission to examination and who took examinat on equivalent to that required by this board.
40. Permanent license withheld until completion of citizenship.
41. At the discretion of the board.
42. Graduates of foreign medical schools are not accepted for licensure by reciprocity.
43. Reciprocity extended at discretion of board to states having comparable licensing requirements and which accept Colorado applicants on a substantially equal reciprocal basis.
44. Consecutive years immediately preceding application.
45. Graduates of medical schools in Canada and foreign medical graduates are not accepted for licensure by reciprocity.
46. Must be residents of the Canal Zone or Republic of Panama.

tered presenting a license from Alaska. There were 59 registered by eight boards on the basis of Canadian or foreign credentials, and 8 were licensed by two boards by special exemption.

In table 10 are reported the numbers from individual schools represented by the 7,925 reciprocity licentiates. Every approved medical school in the United States and the University of Puerto Rico had graduates licensed without written examination in 1958. All of the approved Canadian schools were so registered with one exception—the University of Saskatchewan. The 7,925 licentiates included 7,330 graduates of approved schools in the United States and 173 from Canadian medical schools. Licenses without written examination were obtained by 250 foreign-trained physicians; 18 gradu-

TABLE 9.—*Candidates Licensed by Reciprocity and Endorsement of Credentials, 1958*

ginal Number.....	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
States Issuing Licenses by Reciprocity of Endorsement	Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine	Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	U. S. Govt. Services	National Board of Medical Examiners	Canal Zone, Hawaii, Puerto Rico	Canadian and Foreign	Special Endorsement	Total Licensed
Alabama	..	..	..	4	..	..	..	..	..	..	6	..	1	..	..	..	1	15	1	1	..	..	1	9	2	1	1	..	..	..	..	..	5	..	1	..	..	..	..	1	..	13	2	..	..	..	..	..	..	..	3	6	..	..	..	71
Alaska	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	2	1	2	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	5	..	..	..	16
Arizona	..	..	..	..	10	1	..	..	..	1	..	..	2	..	5	3	..	2	..	2	..	10	11	..	2	..	6	..	..	..	..	2	..	1	4	..	..	5	..	..	1	3	3	3	..	..	1	..	1	..	..	19	..	..	..	98
Arkansas	1	..	..	..	..	..	..	..	..	..	..	..	2	..	1	2	1	9	..	2	2	3	3	3	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	6	4	..	..	..	..	..	..	..	..	..	..	..	..	40
California	2	..	8	7	..	20	3	2	2	12	22	1	113	31	34	35	9	25	3	40	3	85	69	6	84	2	28	1	1	7	..	41	16	9	65	17	17	56	1	4	2	20	37	7	..	11	19	3	44	..	22	608	2	..	..	1,656
Colorado	..	..	1	..	10	..	..	..	..	..	2	..	4	2	4	1	2	5	..	2	..	5	6	..	22	..	8	..	..	1	1	3	..	..	7	3	..	1	..	1	..	1	5	1	..	..	3	..	..	..	..	20	..	..	..	121
Connecticut	..	..	1	..	1	..	..	..	..	..	..	..	4	..	1	..	..	..	..	5	3	2	1	1	2	..	1	..	2	1	..	19	1	..	..	..	1	7	..	..	..	1	1	1	1	2	..	1	..	..	..	161	..	..	..	221
Delaware	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	1	..	..	..	..	1	..	..	..	..	..	..	1	1	..	..	..	..	6	..	..	..	..	..	..	..	2	..	..	..	..	..	4	..	..	..	19
District of Columbia	..	..	..	..	2	2	1	..	..	..	3	..	3	1	..	1	2	2	5	30	..	..	2	1	1	..	..	..	..	..	..	7	5	..	3	1	..	7	1	2	..	..	..	..	..	5	..	1	..	..	..	71	..	13	..	172
Florida	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0
Georgia	3	..	..	1	4	..	..	..	..	..	..	..	3	1	1	..	2	4	..	8	1	4	..	3	2	..	..	..	..	..	..	..	9	..	2	1	..	3	..	2	..	12	3	1	..	4	1	..	1	..	..	15	..	..	..	91
Idaho	..	..	..	..	3	5	..	..	..	..	1	..	2	1	1	2	1	..	..	..	..	..	1	..	2	..	1	..	..	..	..	..	..	..	1	1	2	3	..	..	..	..	2	..	..	..	2	..	..	..	..	4	..	..	..	35
Illinois	1	..	..	..	4	3	..	..	..	..	1	..	..	6	4	4	6	4	..	2	..	5	2	..	10	..	1	..	..	..	..	1	2	..	4	..	1	5	1	..	..	1	3	..	..	1	..	..	6	..	..	95	..	..	..	173
Indiana	1	..	..	1	3	1	..	..	..	2	4	..	13	..	1	6	8	..	..	6	1	10	3	1	15	..	3	..	1	..	..	3	..	..	17	1	..	7	..	..	..	1	1	..	..	2	..	1	2	..	..	..	..	14	..	129
Iowa	..	..	..	3	1	..	..	..	..	1	1	..	6	1	..	3	1	1	..	3	1	..	3	..	5	..	8	..	..	2	..	3	..	..	6	..	1	3	..	1	..	4	2	..	..	1	..	..	7	..	..	18	1	1	..	88
Kansas	..	..	..	..	3	2	..	..	..	..	..	..	1	1	..	..	3	1	..	1	..	2	1	..	..	..	3	..	..	..	..	..	..	..	1	4	..	..	..	..	..	1	4	..	..	..	..	..	..	..	..	6	..	..	..	34
Kentucky	2	..	..	2	1	1	..	..	..	..	4	..	3	1	..	..	..	2	..	..	3	5	2	5	1	..	2	..	..	..	..	2	3	..	5	2	..	1	..	3	1	19	..	..	..	6	..	..	1	..	..	22	..	..	..	99
Louisiana	3	..	..	7	..	1	..	..	..	..	8	..	3	5	2	4	1	..	..	8	..	3	5	25	2	..	..	..	..	..	..	3	..	..	4	3	1	2	..	3	..	4	22	..	..	2	..	..	..	..	..	..	..	..	..	121
Maine	..	..	..	..	2	..	..	..	1	..	..	..	1	..	..	..	..	..	..	..	1	1	..	1	..	..	..	..	1	2	..	..	..	..	1	..	..	3	5	..	..	..	..	..	1	..	..	..	..	..	..	21	..	..	..	41
Maryland	2	..	..	1	4	..	..	..	11	..	5	..	4	1	..	1	1	2	..	..	..	..	2	..	9	..	3	..	..	3	..	5	9	..	2	1	..	19	1	..	..	1	3	..	..	9	..	1	..	..	..	90	..	..	..	190
Massachusetts	..	..	..	..	9	..	4	..	..	..	..	..	..	1	2	4	1	..	2	9	..	..	..	..	5	..	3	..	..	..	..	6	2	..	6	2	..	12	2	..	..	3	2	..	3	5	..	..	4	..	..	292	..	..	..	379
Michigan	..	..	..	..	11	4	..	..	1	..	3	..	11	6	4	2	5	3	..	9	..	..	7	..	12	..	4	..	1	..	..	6	1	..	35	2	..	5	2	1	1	2	2	..	..	3	..	..	3	..	..	22	1	..	..	169
Minnesota	1	..	2	..	8	2	..	..	..	..	..	1	6	8	5	5	1	4	..	2	..	9	..	..	5	..	11	..	..	..	..	2	1	..	5	1	..	11	..	..	1	4	5	..	..	2	..	..	8	..	..	52	..	..	..	162
Mississippi	..	..	..	1	..	..	..	..	..	..	1	..	..	1	..	..	..	9	..	2	..	1	..	..	1	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	9	2	..	..	..	..	..	..	..	..	3	..	..	..	32
Missouri	..	..	..	7	2	1	..	..	..	..	2	..	9	1	1	28	5	4	..	4	..	2	2	1	..	..	..	..	..	..	..	..	..	..	3	..	..	4	..	..	..	2	7	1	..	3	..	..	5	..	..	33	..	..	..	127
Montana	..	..	..	1	..	2	1	..	..	..	..	1	2	1	..	2	..	..	..	..	..	..	1	..	2	..	4	..	..	..	..	..	..	2	..	1	1	1	..	..	1	1	..	1	..	..	..	..	..	..	..	9	..	..	..	34
Nebraska	..	..	..	..	..	1	..	..	..	..	..	..	4	2	8	3	..	..	..	1	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	1	..	..	..	..	..	..	..	2	..	..	2	..	..	..	30
Nevada	..	..	..	..	8	..	..	..	..	..	2	..	1	..	..	..	..	..	..	1	..	1	5	..	..	..	1	..	..	1	..	3	..	..	2	1	1	2	..	..	1	2	..	1	..	..	..	..	1	..	..	7	..	..	..	41
New Hampshire	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	2	..	1	1	..	..	..	..	..	..	..	1	..	1	1	..	3	..	..	3	1	..	..	1	1	..	..	2	..	1	..	..	..	16	..	7	..	44
New Jersey	..	..	..	..	1	1	1	1	..	..	4	..	5	2	2	..	6	2	2	16	2	6	4	..	13	..	..	..	1	..	..	50	2	..	4	1	..	56	9	..	..	..	..	..	..	3	..	1	1	..	..	144	..	..	..	340
New Mexico	..	..	..	1	3	4	1	..	1	..	1	1	3	1	1	3	..	3	..	2	1	1	3	1	1	..	1	..	..	..	..	..	1	..	..	2	..	2	..	..	..	2	4	..	..	1	1	..	1	..	..	5	..	..	..	52
New York	2	..	..	..	12	1	..	..	1	..	..	..	2	5	5	..	6	8	..	16	3	12	5	..	1	..	1	..	..	12	..	..	8	..	..	..	..	34	..	..	..	6	11	..	5	9	3	1	6	..	..	964	5	5	2	1,154
North Carolina	1	..	..	1	4	1	..	..	1	..	13	..	1	1	1	..	1	1	..	6	..	3	1	1	3	..	..	..	..	..	..	2	3	..	..	..	..	1	..	5	..	8	3	..	..	6	..	2	1	..	..	..	..	..	..	71
North Dakota	..	..	..	..	..	1	..	..	..	..	..	..	2	..	..	2	..	..	..	..	..	3	..	..	..	1	2	..	..	..	..	..	..	..	1	..	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	5	..	..	..	19
Ohio	..	..	..	2	11	..	5	..	..	1	3	..	17	15	3	4	6	4	10	25	..	16	6	1	21	..	2	..	3	3	..	11	4	1	..	..	1	31	7	1	1	8	1	..	..	9	1	10	4	1	..	92	1	..	..	345
Oklahoma	3	..	..	4	1	1	1	..	..	..	2	..	2	..	2	5	1	2	..	2	1	..	2	1	1	..	1	..	..	..	..	1	..	..	1	..	..	..	..	..	..	3	6	..	..	1	..	..	..	..	..	6	..	..	..	50
Oregon	..	..	1	1	4	5	..	..	..	..	..	2	2	1	4	2	..	1	..	2	..	1	4	..	3	..	4	..	..	..	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	1	8	1	3	..	..	25	..	..	..	77
Pennsylvania	1	..	..	..	7	2	1	5	..	2	4	..	5	..	1	3	2	2	..	10	1	5	4	1	1	1	2	..	..	14	..	9	5	..	14	1	..	..	..	1	..	1	2	..	1	4	..	2	3	..	3	120	1	..	..	241
Rhode Island	..	..	..	..	1	..	1	..	..	..	..	..	1	..	..	..	..	..	2	1	2	..	..	..	..	..	..	..	1	..	..	..	..	..	2	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	15	..	..	..	28
South Carolina	..	..	..	..	..	..	..	..	..	..	10	..	..	..	..	..	1	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..	1	..	..	..	4	..	..	..	3	..	..	..	..	..	4	..	..	..	33
South Dakota	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	..	2	3	..	1	..	6	..	..	..	..	..	..	3	..	..	..	..	..	..	..	1	1	..	1	..	..	..	1	..	..	3	..	..	..	24
Tennessee	1	..	..	2	1	2	..	..	..	..	6	..	3	1	..	..	5	2	..	1	2	1	1	12	..	..	..	..	..	1	..	3	5	..	4	..	..	4	..	..	..	..	4	1	..	5	1	1	2	..	..	14	..	..	..	85
Texas	3	..	..	11	4	4	..	..	2	1	2	..	16	8	2	4	9	25	..	9	1	4	4	7	38	..	6	..	..	..	2	7	5	..	11	13	..	9	..	1	..	13	..	1	..	4	..	1	6	..	4	..	..	..	..	237
Utah	..	..	..	..	9	2	..	..	..	..	1	2	4	1	1	2	..	2	..	6	..	..	..	..	..	1	..	1	..	..	..	3	..	1	3	1	1	..	..	..	..	..	1	..	1	1	..	..	..	1	1	13	..	..	..	59
Vermont	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	4	..	..	2	..	..	5	..	..	..	1	..	..	..	..	..	..	1	..	..	20	..	2	..	36
Virginia	..	..	..	..	4	..	..	..	2	..	4	..	1	..	..	..	..	4	1	13	..	..	2	..	4	..	..	..	..	1	..	3	9	..	4	..	..	12	..	2	..	5	1	1	..	..	1	3	..	..	..	47	..	..	..	126
Washington	..	..	2	1	14	4	..	..	2	..	..	1	13	2	8	4	1	1	..	4	..	8	12	..	13	1	7	..	..	..	..	5	..	..	5	3	10	3	2	..	..	5	2	2	..	2	..	..	2	..	..	48	..	13	..	200
West Virginia	..	..	..	..	..	..	..	..	..	..	2	..	4	..	..	1	3	..	..	8	1	3	1	..	1	..	..	..	..	1	..	2	2	..	9	..	..	10	..	1	..	5	..	..	..	10	..	..	..	..	..	11	..	..	..	75
Wisconsin	..	..	..	..	7	4	3	..	1	..	1	..	16	5	3	1	1	1	1	2	..	9	8	..	5	..	5	..	..	..	1	5	1	..	10	3	..	4	..	..	..	5	..	..	..	1	1	..	..	..	8	29	..	..	..	141
Wyoming	..	..	..	..	1	6	..	..	..	..	..	..	..	1	2	2	..	..	..	..	..	1	2	..	2	..	3	..	..	..	..	..	..	1	..	1	..	..	..	..	..	1	..	1	..	..	..	..	..	..	..	2	..	..	..	26
Canal Zone, Guam, Hawaii, Puerto Rico, and Virgin Islands	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	3	..	..	3	..	..	2	..	..	..	1	1	..	..	..	..	..	1	..	..	47	..	1	6	70
Totals	27	0	15	59	173	84	22	8	27	20	118	0	296	116	109	139	92	151	31	208	30	226	194	81	205	7	132	2	11	50	4	210	110	18	251	67	37	315	32	29	11	180	148	23	13	120	12	30	118	2	41	3,215	11	59	8	7,025
Marginal Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56

ates of approved medical schools no longer in operation were registered, 26 graduates of unapproved medical schools, and 138 graduates of schools of osteopathy. This table reflects the movement of physicians to states other than the one in which they obtained their professional training or in which they first established their practice.

Licentiates Representing Additions to the Medical Profession

The number of licentiates of 1958 who received their first license to practice medicine and surgery during the last calendar year and thus represent additions to the medical profession is shown in table 11. The compilation of this table includes candidates examined and licensed in 1958, some who were examined in previous years but whose licenses were withheld until 1958 pending completion of a required internship, citizenship, or other technicalities, and physicians not previously licensed in any state who were certified during the year on the basis of the examination of the National Board of Medical Examiners. The majority represented are recent graduates.

There were 7,809 additions to the medical profession in the United States and its territories and outlying possessions. In 1958, there were approximately 3,700 deaths of physicians reported to the offices of the American Medical Association. Deducting the number of deaths in 1958 from the number of licenses issued for the first time, it will be seen that there was a net increase of 4,109 in the physician population last year.

Among the 7,809 licentiates representing additions to the medical profession in the last calendar year were 6,155 who secured their licenses by examination and 1,654 by endorsement of credentials. The majority of the latter were diplomats of the National Board of Medical Examiners.

The number of first licentiates, arranged in nine geographical divisions, are compiled in table 12. The geographical divisions representing the greatest number of additions to the medical profession were the Middle Atlantic States with 1,708, the East North Central States with 1,447, and the South Atlantic States with 1,184. More than 400 were added in each of five other groups—Pacific 790, West North Central 784, West South Central 748, New England 470, and East South Central 446. The Mountain States added 129 and the territories and possessions 103.

In the 24 years from 1935 to 1958, inclusive, there were 157,891 new additions to the medical profession as determined by the number who received their first license. Figures for each year during this period are presented in table 13. Of the 157,891 in this group, 131,252 were licensed after written examination and 26,639 by endorsement of credentials. The total number of licenses issued in the same period (table 2) was 282,486.

Registration of Physicians, 1904-1958

A tabulation of total numbers of physicians registered for 55 years from 1904 to 1958, inclusive, is given in table 14. This study contains figures pertaining to the number of physicians examined and registered by written examination, the annual percentage of failures, the number registered annually by reciprocity or endorsement of credentials, and the total registered. The number of physicians registered annually from 1904 to 1933 shows slight fluctuation, except in 1918, when only 4,231 were licensed.

In the years since 1946, the numbers registered decreased annually until 1952, although they far exceeded the prewar totals. The last six years has shown an increase in the number of physicians registered, though the number registered in 1958 was slightly lower than in the previous year.

The highest percentage of failures was 21.7 in 1908. Many of the medical schools at that time were proprietary institutions operating for financial returns rather than the improvement of the medical curriculum. Beginning in 1915, the percentage of failures began to drop, reaching a low of 5.7% in 1930. Beginning in 1936, the percentage of failures began to rise, reaching another peak of 20.7 in 1940. This was the result of the increase in the number of foreign-trained physicians seeking licensure in the United States, many of whom were not successful after repeated attempts at licensure examinations. While the percentage of failures have been reduced somewhat in recent years, it still reflects the unsuccessful attempts of foreign-trained physicians, graduates of unapproved medical schools, and schools of osteopathy to secure licenses. The annual failure rate among graduates of approved medical schools is about 4%. This table refers to examinations given annually rather than to individuals examined. A candidate who fails more than once in a state in a given year is counted as one failure, but should he again fail in a succeeding year, this fact is computed among the failures for that year. Likewise, a successful candidate securing a license in more than one state in a given year is counted in both states and likewise is counted if he passed examinations in later years. The figures in this table give only a fair approximation of the number of physicians added to the profession.

Graduates of Approved Schools and Others Registered, 1922-1958

In table 15, the numbers of physicians registered since 1922 are grouped in two categories, namely, graduates of approved medical schools and others. In the computation of these figures, schools rated in classes A and B prior to 1928 by the Council on Medical Education and Hospitals of the American Medical Association are included in the first grouping. In 1928, the classification of medical schools in categories of A, B, and C by the Council was discontinued, and a list of approved medical schools has since been maintained. In the column headed

TABLE 10.—*Candidates Licensed by*

Marginal Numbers	School	Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine
	Marginal Numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	ALABAMA																			
1	Medical College of Alabama, Birmingham	1	..	1	..	2	..	..	..	..	..	3	..	..	..	..	..	..	1	..
	ARKANSAS																			
2	University of Arkansas School of Medicine, Little Rock	4	..	..	..	6	..	..	..	..	..	1	1	1	1	3	..	2	7	..
	CALIFORNIA																			
3	College of Medical Evangelists, Loma Linda, Los Angeles	1	1	2	..	19	2	..	..	2	..	5	..	..	..	2	..	1	..	..
4	University of California School of Medicine, Los Angeles	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
5	University of Southern California School of Medicine, Los Angeles	..	..	3	..	2	1	..	..	..	..	..	..	1	..	..	1	..	..	..
6	Stanford University School of Medicine, San Francisco	..	..	1	..	13	..	..	..	..	..	..	1	..	..	..	..	1	..	..
7	University of California School of Medicine, San Francisco	..	..	1	..	2	3	..	..	1	..	..	..	1	..	..	1	..	..	1
	COLORADO																			
8	University of Colorado School of Medicine, Denver	..	..	1	..	20	4	..	..	3	..	..	4	2	..	..	3	1	1	..
	CONNECTICUT																			
9	Yale University School of Medicine, New Haven	..	..	1	..	18	..	26	..	2	..	3	1	2	..	1	..	..	..	2
	DISTRICT OF COLUMBIA																			
10		1	..	..	..	15	..	8	..	21	..	1	..	4	..	..	..	..	1	..
11		1	..	2	..	23	2	3	2	23	..	1	1	..	..	1	..	2	1	..
12		1	..	..	..	18	2	..	..	20	..	..	..	2	1	1	..	..	..	..
	FLORIDA																			
13	University of Miami School of Medicine, Coral Gables	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	GEORGIA																			
14	Emory University School of Medicine, Emory University	4	..	..	..	8	1	..	..	..	..	3	1	..	1	..	..	3	3	..
15	Medical College of Georgia, Augusta	1	..	..	..	5	1	..	..	1	..	..	..	..	..	..	..	..	3	..
	ILLINOIS																			
16	Chicago Medical School	..	..	..	..	21	1	..	..	1	..	..	..	11	..	..	..	..	..	..
17	Northwestern University Medical School, Chicago	2	1	2	1	69	7	2	..	1	..	1	2	16	4	4	1	3	1	1
18	Stritch School of Medicine of Loyola University, Chicago	..	..	1	..	31	..	1	..	..	..	..	1	16	1	3	..	1	1	..
19	University of Chicago, The School of Medicine	..	..	1	..	21	..	1	..	1	..	..	..	14	4	..	1	..	1	..
20	University of Illinois College of Medicine, Chicago	1	..	4	..	61	2	2	..	2	..	3	2	15	6	4	..	1	1	..
	INDIANA																			
21	Indiana University School of Medicine, Indianapolis	..	..	1	..	33	2	..	..	1	..	1	1	6	..	1	1	..	5	..
	IOWA																			
22	State University of Iowa College of Medicine, Iowa City	..	..	5	2	38	3	2	..	1	..	1	1	6	1	2	1	..	2	..
	KANSAS																			
23	University of Kansas School of Medicine, Lawrence, Kansas City	..	..	3	2	31	1	..	..	..	..	..	2	2	4	3	..	..	4	..
	KENTUCKY																			
24	University of Louisville School of Medicine	1	..	..	1	12	1	..	..	..	..	2	1	6	5	1	1	1	..	..
	LOUISIANA																			
25	Louisiana State University School of Medicine, New Orleans	4	..	2	4	5	1	..	..	2	..	1	..	2	..	..	1	..	..	..
26	Tulane University of Louisiana School of Medicine, New Orleans	12	..	..	4	22	2	1	..	..	..	4	..	1	1	2	..	2	16	1
	MARYLAND																			
27	Johns Hopkins University School of Medicine, Baltimore	1	1	1	1	22	2	4	..	4	..	4	..	1	1	1	..	1	4	..
28	University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore	..	..	2	2	13	1	3	1	5	..	2	..	..	4	..	..	..	1	..
	MASSACHUSETTS																			
29	Boston University School of Medicine	..	..	..	..	15	1	4	..	2	..	..	..	2	..	1	..	3	..	..
30	Harvard Medical School, Boston	1	2	4	1	43	3	15	..	2	..	2	1	2	2	..	..	6	1	3
31	Tufts University School of Medicine, Boston	..	..	..	1	28	..	13	..	1	..	..	..	3	..	..	..	1	..	9
	MICHIGAN																			
32	University of Michigan Medical School, Ann Arbor	..	..	4	1	49	4	1	..	..	..	3	..	4	6	1	2	1	3	..
33	Wayne State University College of Medicine, Detroit	..	..	2	1	27	..	1	..	..	..	..	..	..	1	..	..	1	..	..
	MINNESOTA																			
34	University of Minnesota Medical School, Minneapolis	2	..	9	1	59	2	1	..	1	..	..	1	1	1	2	1	1	2	..
	MISSISSIPPI																			
35	University of Mississippi School of Medicine, Jackson	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..
	MISSOURI																			
36	University of Missouri School of Medicine, Columbia	..	..	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
37	Saint Louis University School of Medicine	1	1	1	..	34	4	2	..	2	..	..	1	9	5	1	..	1	2	..
38	Washington University School of Medicine	..	1	1	..	53	6	..	1	..	..	3	..	4	2	2	..	1	..	..
	NEBRASKA																			
39	Creighton University School of Medicine, Omaha	..	..	3	1	24	6	..	..	..	..	..	1	..	1	7	3	..	..	..
40	University of Nebraska College of Medicine, Omaha	1	2	6	..	29	8	1	..	..	..	..	..	3	1	3	2	2	..	..
	NEW YORK																			
41	Albany Medical College of Union University	..	..	..	..	10	1	2	..	1	..	1	..	..	..	..	..	1	..	1
42	University of Buffalo School of Medicine	..	..	2	..	35	..	..	1	1	..	2	..	..	..	1	..	1	..	..
43	Columbia University College of Physicians and Surgeons, New York	1	1	..	..	41	3	19	..	3	..	..	..	..	..	1	1	6	..	2
	Marginal Numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

20 Maryland	21 Massachusetts	22 Michigan	23 Minnesota	24 Mississippi	25 Missouri	26 Montana	27 Nebraska	28 Nevada	29 New Hampshire	30 New Jersey	31 New Mexico	32 New York	33 North Carolina	34 North Dakota	35 Ohio	36 Oklahoma	37 Oregon	38 Pennsylvania	39 Rhode Island	40 South Carolina	41 South Dakota	42 Tennessee	43 Texas	44 Utah	45 Vermont	46 Virginia	47 Washington	48 West Virginia	49 Wisconsin	50 Wyoming	51 Canal Zone, Guam, Hawaii, Puerto Rico, and Virgin Islands	52 Totals	Marginal Numbers
2	1	..	1	..	..	..	..	..	..	..	..	2	1	..	..	..	..	1	..	..	..	1	2	..	..	..	..	..	..	..	..	19	1
1	1	..	1	3	7	1	..	..	..	..	1	1	1	..	2	4	2	..	..	..	..	2	11	..	..	..	..	..	..	..	1	65	2
4	..	7	6	..	1	..	1	1	..	..	1	3	3	..	4	..	8	..	..	..	..	3	2	2	..	4	6	..	1	..	3	95	3
2	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	1	8	4
..	1	..	2	..	..	..	..	..	..	..	..	1	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	14	5
..	2	..	2	..	..	..	..	4	..	..	2	2	..	..	3	..	1	2	..	..	..	1	..	1	..	..	..	..	..	1	..	37	6
1	4	1	..	..	..	..	..	1	..	..	..	2	..	..	1	1	..	1	..	..	..	..	1	1	..	1	1	..	..	..	..	26	7
..	..	4	3	..	1	2	..	..	..	1	4	1	1	..	..	1	4	1	..	..	..	1	3	..	..	..	2	1	3	4	..	76	8
6	9	1	1	..	2	1	..	..	2	2	..	33	..	..	2	1	1	2	1	..	..	1	..	1	2	..	3	1	1	..	..	129	9
25	13	..	1	1	2	2	..	..	..	8	..	34	..	..	7	..	..	7	..	..	..	..	2	..	..	14	..	1	..	..	1	169	10
17	2	1	3	..	1	..	..	..	..	4	1	14	..	1	3	1	..	7	..	1	..	2	..	4	..	8	3	1	2	..	..	138	11
5	1	4	1	1	2	..	..	..	..	2	1	8	2	..	4	1	..	3	..	1	..	..	1	..	..	2	..	1	1	..	1	87	12
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	13
1	..	..	..	..	..	..	..	1	..	2	1	..	5	..	..	..	..	1	..	4	..	2	3	..	..	1	..	..	..	..	..	45	14
..	..	..	..	..	..	..	..	1	..	2	..	1	5	..	1	1	..	..	..	7	..	3	..	1	..	1	..	1	..	..	..	35	15
..	4	2	1	..	1	..	..	..	..	12	..	10	1	..	3	..	1	1	1	..	..	..	2	..	..	1	2	..	1	..	..	113	16
2	3	4	11	..	3	4	..	1	1	5	..	15	1	2	11	4	3	4	..	..	2	1	2	3	..	1	11	..	10	..	4	226	17
1	4	2	1	..	..	..	1	1	..	1	..	9	..	..	6	..	..	3	..	..	2	1	4	1	..	..	1	..	..	1	1	96	18
3	1	1	1	..	3	..	2	..	..	..	2	14	..	..	2	..	2	4	..	..	..	..	3	..	..	1	6	1	1	..	2	93	19
2	1	5	7	..	4	1	2	1	..	2	1	3	1	4	6	1	3	1	..	..	1	2	3	1	..	1	5	3	9	1	..	175	20
1	1	5	6	1	3	2	2	..	..	2	1	4	1	..	14	..	1	..	..	..	..	1	6	1	..	..	2	..	6	1	2	115	21
1	3	5	5	..	1	..	2	1	..	2	1	5	1	..	2	3	3	1	..	..	..	1	3	..	..	1	7	..	4	2	..	119	22
1	3	2	5	..	28	2	1	..	..	..	3	2	..	2	3	4	2	3	..	..	..	1	4	2	..	..	4	1	1	1	..	130	23
1	..	4	1	..	5	2	..	..	..	..	..	6	1	..	7	1	..	2	..	1	..	4	4	..	..	..	1	3	1	..	..	76	24
1	..	1	1	1	1	..	..	..	..	..	..	..	1	..	..	1	..	1	..	..	1	1	8	..	..	1	..	..	..	..	..	41	25
..	..	1	3	7	2	..	..	..	..	2	2	8	..	..	5	1	..	1	..	..	..	1	17	1	..	..	1	..	..	..	3	123	26
4	4	5	1	..	2	..	1	..	..	7	..	19	5	..	10	2	..	4	..	2	..	3	6	2	1	6	1	5	2	..	..	140	27
2	4	1	1	1	2	..	..	1	..	1	2	5	1	1	6	..	..	5	..	2	..	..	3	4	..	5	1	2	..	..	2	86	28
..	37	1	..	1	..	..	..	1	2	6	..	22	..	..	3	..	..	2	1	1	..	..	..	1	..	1	3	1	1	..	..	112	29
7	69	1	2	..	3	..	..	2	4	4	1	39	..	1	7	2	1	9	1	1	..	4	2	1	2	4	3	3	3	1	2	267	30
3	74	1	5	..	2	..	..	1	3	4	1	17	..	..	6	1	..	4	8	..	..	1	..	1	..	2	2	..	2	..	1	195	31
..	3	2	6	..	2	..	..	1	2	3	1	4	2	1	11	..	1	4	..	..	2	1	2	1	..	1	1	1	10	..	1	142	32
..	..	..	2	..	1	..	..	..	..	1	..	3	..	..	..	..	..	1	..	..	..	..	1	..	..	..	2	..	..	..	..	44	33
2	1	3	1	..	1	1	1	4	..	2	2	3	1	..	3	..	3	1	..	..	1	..	2	..	..	2	6	..	3	..	2	129	34
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	35
..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	36
4	3	7	2	1	3	..	1	..	1	3	1	1	1	..	16	..	2	1	..	..	..	..	2	..	..	2	6	1	3	..	..	125	37
5	2	2	3	..	1	1	..	1	..	..	..	12	1	..	3	2	1	1	..	..	..	1	4	..	..	3	5	..	1	..	..	123	38
1	2	3	3	..	2	1	5	1	..	1	1	6	..	1	1	1	3	1	..	..	2	..	2	..	..	..	7	..	1	..	2	93	39
3	1	2	11	..	1	4	2	..	..	..	1	3	..	1	2	1	2	3	..	..	5	..	7	..	..	..	3	..	4	3	..	117	40
2	3	..	..	..	..	..	..	2	..	4	..	37	..	..	1	..	..	1	..	..	..	1	..	..	1	..	..	..	..	1	..	70	41
2	4	2	2	..	1	1	..	..	..	2	1	51	..	..	5	..	..	5	..	..	1	..	..	2	1	1	2	..	1	..	..	127	42
6	8	..	3	..	1	..	..	1	1	11	2	92	..	1	5	..	3	2	1	..	..	..	2	1	2	3	3	..	1	1	2	*230*	*43*
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	

TABLE 10.—*Candidates Licensed by*

	Marginal Numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Marginal Numbers	School	Alabama	Alaska	Arizona	Arkansas	California	Colorado	Connecticut	Delaware	District of Columbia	Florida	Georgia	Idaho	Illinois	Indiana	Iowa	Kansas	Kentucky	Louisiana	Maine
	NEW YORK																			
44	Cornell University Medical College, New York	..	..	1	..	26	2	13	..	2	..	1	1	..	2	1	..	2	..	..
45	New York Medical College, Flower and Fifth Avenue Hospitals, New York	1	1	..	..	35	2	13	2	2	..	..	..	..	1	1	..	..	..	1
46	New York University College of Medicine, New York	..	..	..	..	43	2	14	1	3	..	2	..	2	1	1	..	1	1	1
47	State University of New York, Downstate Medical Center, New York	..	..	..	..	36	1	14	..	3	..	..	1	..	1	1	..	..	..	..
48	University of Rochester School of Medicine and Dentistry	1	..	1	..	13	1	4	..	1	..	..	..	3	..	1	..	2	..	..
49	State University of New York, Upstate Medical Center, Syracuse	..	..	..	..	20	..	4	..	1	..	1	..	..	..	1	..	..	..	..
	NORTH CAROLINA																			
50	University of North Carolina School of Medicine, Chapel Hill	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
51	Duke University School of Medicine, Durham	2	..	1	2	14	..	2	1	1	..	3	..	..	..	..	..	4	1	..
52	Bowman Gray School of Medicine of Wake Forest College, Winston-Salem	..	..	..	1	8	..	..	..	1	..	4	..	..	..	..	..	..	1	..
	OHIO																			
53	University of Cincinnati College of Medicine	..	..	1	..	25	3	..	..	1	..	..	..	1	6	3	..	4	1	..
54	Western Reserve University School of Medicine, Cleveland	..	..	3	..	22	..	..	..	2	..	..	..	4	4	2	1	1	..	..
55	Ohio State University College of Medicine, Columbus	1	..	1	..	21	2	..	..	..	..	2	1	1	3	..	..	..	2	..
	OKLAHOMA																			
56	University of Oklahoma School of Medicine, Oklahoma City	..	..	..	..	18	3	..	..	1	..	1	1	..	1	..	4	2	3	..
	OREGON																			
57	University of Oregon Medical School, Portland	1	3	1	..	20	..	..	..	..	..	..	3	2	..	1	..	..	1	..
	PENNSYLVANIA																			
58	Hahnemann Medical College and Hospital of Philadelphia	1	..	..	..	17	1	2	1	..	..	..	1	..	4	3	1	..	2	..
59	Jefferson Medical College of Philadelphia	1	..	3	..	29	2	1	1	1	..	2	..	2	2	1	..	..	1	1
60	Temple University School of Medicine, Philadelphia	..	..	2	..	21	..	1	2	1	..	1	1	1	..	1	1	..	..	..
61	University of Pennsylvania School of Medicine, Philadelphia	1	..	2	..	32	..	5	..	5	..	1	..	3	4	2	..	3	..	3
62	Woman's Medical College of Pennsylvania, Philadelphia	1	..	1	..	10	..	..	..	1	..	1	..	..	1	..	..	..	..	..
63	University of Pittsburgh School of Medicine	..	..	1	..	13	..	..	1	1	..	..	1	1	1	..	..	2	1	..
	PUERTO RICO																			
64	University of Puerto Rico School of Medicine, San Juan	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	SOUTH CAROLINA																			
65	Medical College of South Carolina, Charleston	1	..	..	..	3	1	..	..	1	..	2	..	..	..	1	..	2	3	..
	TENNESSEE																			
66	University of Tennessee College of Medicine, Memphis	16	1	3	9	18	..	1	..	..	..	9	..	1	..	1	1	17	6	..
67	Meharry Medical College, Nashville	..	..	..	..	20	..	1	..	3	..	..	..	..	3	2	..	2	2	..
68	Vanderbilt University School of Medicine, Nashville	3	..	..	..	9	1	..	..	1	..	3	..	2	1	2	..	4	4	..
	TEXAS																			
69	University of Texas Southwestern Medical School, Dallas	1	..	..	..	12	..	1	..	..	..	2	..	..	1	..	..	..	2	..
70	University of Texas Medical Branch, Galveston	..	..	..	..	15	4	1	..	..	..	1	1	3	..	1	..	..	15	..
71	Baylor University College of Medicine, Houston	..	..	2	3	11	..	..	..	..	..	..	1	1	..	1	2	..	5	..
	UTAH																			
72	University of Utah School of Medicine, Salt Lake City	..	..	2	..	11	1	1	..	1	..	..	..	..	..	..	..	..	..	..
	VERMONT																			
73	University of Vermont College of Medicine, Burlington	..	..	..	..	7	..	5	1	..	..	..	..	1	..	..	..	..	..	3
	VIRGINIA																			
74	University of Virginia School of Medicine, Charlottesville	..	..	..	..	8	..	..	..	4	..	3	..	1	2	1	..	2	5	..
75	Medical College of Virginia, Richmond	..	..	..	..	5	..	2	1	1	..	1	..	..	1	..	..	4	1	..
	WASHINGTON																			
76	University of Washington School of Medicine, Seattle	..	..	..	..	21	2	1	..	..	..	1	..	..	..	..	..	..	1	..
	WISCONSIN																			
77	University of Wisconsin Medical School, Madison	..	..	1	..	19	..	1	..	1	..	1	..	2	2	3	..	..	..	..
78	Marquette University School of Medicine, Milwaukee	..	..	3	..	27	..	..	..	..	..	..	..	4	2	3	..	..	..	..
	CANADA																			
79	University of Alberta	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
80	University of British	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..
81	University of Manitol	..	..	..	..	10	..	..	..	..	..	..	..	..	..	1	..	..	..	..
82	Dalhousie University	..	..	..	..	5	..	..	..	..	..	..	..	..	..	..	..	1	..	1
83	Queen's University Faculty of Medicine, Kingston	1	..	..	..	3	..	1	..	..	..	..	..	..	..	..	..	..	..	..
84	University of Western Ontario Faculty of Medicine, London	..	..	..	..	1	..	1	..	..	..	..	..	..	..	1	..	..	..	..
85	University of Ottawa Faculty of Medicine, Ottawa	..	..	..	..	3	..	3	..	..	..	..	..	..	..	..	..	..	..	1
86	University of Toronto Faculty of Medicine, Toronto	..	1	..	..	8	..	3	..	..	..	..	..	1	..	..	..	..	..	..
87	McGill University Faculty of Medicine, Montreal	..	..	2	..	14	1	8	..	1	..	..	..	..	2	1	..	1	..	2
88	University of Montreal Faculty of Medicine, Montreal	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	..	..
89	Laval University Faculty of Medicine, Quebec	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
90	University of Saskatchewan College of Medicine, Saskatoon	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	OTHERS																			
91	Foreign Medical Faculties	..	..	..	..	..	..	5	2	26	..	1	..	..	17	1	..	..	..	8
92	Extinct Medical Schools	..	..	..	1	2	..	1	..	1	..	..	..	..	2	2	..	..	..	..
93	Unapproved Medical Schools	..	..	..	1	11	..	..	..	1	..	1	..	..	..	..	..	..	..	..
94	Schools of Osteopathy	..	..	..	..	..	15	..	1	..	..	..	..	..	12	..	4	..	..	..
95	Totals	74	16	98	40	1,656	121	221	19	172	0	91	35	173	129	88	34	90	121	41
	Marginal Numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	
Maryland	Massachusetts	Michigan	Minnesota	Mississippi	Missouri	Montana	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oklahoma	Oregon	Pennsylvania	Rhode Island	South Carolina	South Dakota	Tennessee	Texas	Utah	Vermont	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Canal Zone, Guam, Hawaii, Puerto Rico, and Virgin Islands	Totals	Marginal Numbers
..	10	4	1	..	1	..	..	1	1	10	..	61	..	1	5	1	1	5	..	..	..	3	..	1	2	2	1	..	2	..	2	166	44
5	11	..	2	..	1	..	..	..	..	14	..	72	1	..	1	..	..	3	2	..	..	..	1	..	2	3	1	1	2	..	1	182	45
7	5	1	1	..	..	..	..	1	2	23	..	97	..	..	3	..	..	3	..	..	..	..	..	..	2	4	2	..	1	..	1	225	46
2	6	3	1	..	2	..	1	..	..	28	..	123	..	..	1	..	1	8	..	..	..	2	1	1	..	2	..	2	2	..	..	243	47
2	5	..	2	..	1	1	..	..	..	5	..	28	..	..	6	..	..	2	..	..	..	1	2	..	1	1	5	3	5	1	..	98	48
2	3	..	1	..	..	..	..	..	..	3	..	58	..	..	5	..	..	5	..	..	..	1	1	1	1	..	1	2	1	..	..	112	49
1	..	1	1	..	..	..	..	..	..	..	..	1	2	..	1	..	..	..	..	1	..	1	1	..	..	..	..	..	1	..	..	13	50
2	2	..	..	..	1	..	..	1	1	1	..	8	1	..	1	..	..	6	..	4	..	2	3	1	..	6	..	1	..	..	..	72	51
3	..	..	..	2	..	..	..	..	..	2	..	1	1	..	..	..	..	2	..	..	1	1	2	..	..	5	..	..	..	..	..	35	52
1	2	1	3	..	2	..	..	1	1	1	..	1	..	..	..	..	..	2	..	..	..	2	1	1	..	1	1	2	1	..	1	70	53
1	1	11	1	..	..	..	..	..	1	2	..	7	..	..	1	..	..	4	..	..	..	..	4	..	..	2	2	..	1	..	1	78	54
1	1	17	1	..	1	..	..	1	1	1	..	1	..	..	..	1	1	5	..	..	..	..	1	1	1	..	1	7	5	..	..	82	55
1	1	2	1	..	..	1	..	..	..	1	2	..	1	..	..	1	..	1	1	..	..	..	13	1	..	..	3	..	3	1	..	68	56
..	..	..	2	..	..	1	..	2	..	..	2	..	..	..	1	..	16	..	..	..	..	..	..	2	..	..	14	..	..	..	1	73	57
4	4	..	3	..	..	..	..	..	..	10	..	6	1	..	4	..	..	12	..	..	..	1	..	..	..	2	1	..	1	1	..	83	58
6	7	1	3	1	1	..	1	..	..	13	2	18	..	..	11	..	1	23	..	..	1	1	4	1	..	3	1	3	1	..	1	151	59
3	3	2	3	..	4	1	1	1	1	13	..	9	..	..	6	..	1	10	..	..	..	..	..	..	1	5	1	2	..	1	2	102	60
5	7	3	3	..	..	1	1	..	4	26	1	19	1	1	5	..	3	19	..	1	..	..	3	..	4	2	..	6	1	..	..	171	61
1	..	1	1	..	1	..	..	..	..	2	..	10	..	1	..	..	..	5	..	..	..	1	1	1	1	3	1	..	..	..	..	45	62
1	2	..	..	..	..	..	1	..	..	1	..	4	..	..	11	..	..	5	..	..	..	1	..	..	..	2	3	3	..	..	1	57	63
1	..	..	..	..	..	..	1	..	..	1	..	2	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	..	..	..	19	28	64
..	..	1	..	..	1	..	..	..	..	..	..	..	3	..	1	..	..	1	..	1	..	..	2	..	..	3	..	..	..	..	..	27	65
..	1	2	4	6	3	1	..	2	1	..	3	5	7	..	5	3	..	2	..	3	1	10	11	..	1	5	3	5	1	..	..	168	66
4	..	5	..	..	2	..	..	..	..	1	..	6	3	..	6	1	1	5	..	1	..	2	1	..	..	1	..	..	3	..	1	76	67
1	2	..	..	3	1	..	..	..	..	..	..	2	2	..	3	1	..	1	..	..	..	1	7	..	..	..	4	..	2	1	..	61	68
2	2	..	..	..	2	..	..	..	..	..	..	1	..	..	..	3	..	..	..	..	1	..	..	1	..	..	..	..	..	..	..	31	69
1	..	1	2	1	4	..	..	..	1	..	4	3	2	..	1	2	..	2	..	..	..	2	..	..	..	..	1	..	..	..	..	68	70
..	..	2	3	1	1	..	..	..	..	..	..	5	1	..	..	1	..	2	..	..	..	1	2	..	..	1	..	..	..	..	..	46	71
..	..	1	1	..	1	1	..	2	..	..	..	..	..	..	2	..	1	..	..	..	..	1	..	12	..	1	2	..	..	1	..	42	72
1	11	1	..	..	..	1	..	..	..	2	1	19	1	..	2	..	..	3	..	..	1	..	..	1	5	..	..	..	1	..	..	67	73
6	3	..	..	..	1	..	..	..	..	3	1	7	1	..	4	1	1	2	..	..	..	3	2	..	..	..	2	3	..	..	..	66	74
6	..	..	2	..	2	..	..	..	1	..	..	3	4	..	6	..	1	6	..	2	..	1	3	1	..	2	1	8	..	..	..	65	75
..	..	..	..	..	..	..	..	..	..	1	..	5	..	1	1	..	..	1	..	..	1	..	..	..	..	..	11	..	1	..	..	48	76
..	2	1	6	..	3	..	..	1	..	..	1	4	1	..	1	..	1	1	..	..	..	..	4	..	..	..	3	..	4	..	..	63	77
..	2	3	7	1	1	..	..	..	..	3	..	8	..	..	3	..	..	3	..	..	..	1	2	..	..	..	..	..	7	..	2	82	78
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	4	79
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	2	80
..	..	1	..	..	..	..	..	..	..	..	..	4	..	..	..	..	1	..	..	..	1	..	..	1	..	..	4	..	..	..	..	23	81
..	1	..	..	..	..	..	..	..	2	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	11	82
..	1	1	..	..	..	..	..	..	1	..	..	3	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	12	83
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	5	84
..	1	..	..	..	..	..	..	..	1	..	..	4	..	..	2	..	..	..	..	..	..	..	..	..	2	..	2	..	..	..	..	19	85
..	..	1	..	..	..	..	..	..	..	..	..	4	..	..	1	..	..	..	..	..	..	..	..	..	..	1	2	..	1	..	..	23	86
2	6	3	1	..	..	1	..	..	1	1	..	11	..	..	3	..	..	..	1	..	..	..	..	..	1	1	2	..	1	..	1	68	87
..	1	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	5	88
..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	89
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0	90
..	..	14	..	..	..	..	3	..	7	37	..	3	1	..	71	1	..	..	11	..	..	5	3	..	2	..	17	..	10	..	5	250	91
..	..	3	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	..	3	..	..	18	92
..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	4	..	..	..	2	..	4	..	..	26	93
..	6	..	..	..	..	..	..	..	1	45	..	3	..	..	3	..	..	..	..	..	..	..	43	..	..	..	..	..	2	3	..	138	94
190	379	169	162	32	127	34	30	41	44	340	52	1,154	71	19	345	50	77	241	28	33	24	85	237	59	36	126	200	75	141	26	70	1,925	95
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	

"Others" are included graduates of foreign faculties of medicine, class C graduates, osteopaths given recognition by medical licensing boards, and graduates of schools not approved by the Council subsequent to 1928.

TABLE 11.—*Licentiates Representing Additions to the Medical Profession, 1958*

	Examination	Reciprocity and Endorsement	Total
Alabama	73	3	76
Alaska	4	..	4
Arizona	7	6	13
Arkansas	86	..	86
California	492	190	682
Colorado	73	8	81
Connecticut	96	80	176
Delaware	5	..	5
District of Columbia	6	46	52
Florida	137	..	137
Georgia	232	5	237
Idaho	3	1	4
Illinois	324	63	387
Indiana	170	9	179
Iowa	90	4	94
Kansas	114	1	115
Kentucky	93	9	102
Louisiana	229	..	229
Maine	20	2	22
Maryland	262	18	280
Massachusetts	11	196	207
Michigan	297	8	305
Minnesota	171	12	183
Mississippi	120	..	120
Missouri	262	7	269
Montana	1	1	2
Nebraska	109	1	110
Nevada	2	1	3
New Hampshire	5	9	14
New Jersey	106	28	134
New Mexico	3	..	3
New York	294	760	1,054
North Carolina	178	..	178
North Dakota	6	..	6
Ohio	401	43	444
Oklahoma	81	3	84
Oregon	27	..	27
Pennsylvania	472	48	520
Rhode Island	38	6	44
South Carolina	59	1	60
South Dakota	7	..	7
Tennessee	145	3	148
Texas	346	3	349
Utah	15	4	19
Vermont	6	1	7
Virginia	208	14	222
Washington	59	18	77
West Virginia	12	1	13
Wisconsin	127	5	132
Wyoming	4	..	4
Canal Zone	..	4	4
Hawaii	9	7	16
Guam	..	2	2
Puerto Rico	57	22	79
Virgin Islands	1	1	2
Totals	6,155	1,654	7,809

In 1958, there were 15,193 candidates registered, of whom 13,097, or 86.2%, were graduates of approved schools and 2,096, or 13.8%, were in the second group. In the 37 years recorded in this table, 375,756 candidates were registered, including 337,843 (89.9%) who were graduates of medical schools in the approved group and 37,913 (10.1%) who were other graduates.

TABLE 12.—*Licentiates Representing Additions to the Medical Profession Grouped in Geographical Divisions, 1958*

	Examination	Reciprocity and Endorsement	Total
New England			
Maine	20	2	22
New Hampshire	5	9	14
Vermont	6	1	7
Massachusetts	11	196	207
Rhode Island	38	6	44
Connecticut	96	80	176
Totals	176	294	470
Middle Atlantic			
New York	294	760	1,054
New Jersey	106	28	134
Pennsylvania	472	48	520
Totals	872	836	1,708
East North Central			
Ohio	401	13	444
Indiana	170	9	179
Illinois	324	63	387
Michigan	297	8	305
Wisconsin	127	5	132
Totals	1,319	128	1,447
West North Central			
Minnesota	171	12	183
Iowa	90	4	94
Missouri	262	7	269
North Dakota	6	..	6
South Dakota	7	..	7
Nebraska	109	1	110
Kansas	114	1	115
Totals	759	25	784
South Atlantic			
Delaware	5	..	5
Maryland	262	18	280
District of Columbia	6	46	52
Virginia	208	14	222
West Virginia	12	1	13
North Carolina	178	..	178
South Carolina	59	1	60
Georgia	232	5	237
Florida	137	..	137
Totals	1,099	85	1,184
East South Central			
Kentucky	93	9	102
Tennessee	145	3	148
Alabama	73	3	76
Mississippi	120	..	120
Totals	431	15	446
West South Central			
Arkansas	86	..	86
Louisiana	229	..	229
Oklahoma	81	3	84
Texas	346	3	349
Totals	742	6	748
Mountain			
Montana	1	1	2
Idaho	3	1	4
Wyoming	4	..	4
Colorado	73	8	81
New Mexico	3	..	3
Arizona	7	6	13
Utah	15	4	19
Nevada	2	1	3
Totals	108	21	129
Pacific			
Alaska	4	..	4
Washington	59	18	77
Oregon	27	..	27
California	492	190	682
Totals	582	208	790
Territories and Possessions			
Canal Zone	..	4	4
Guam	..	2	2
Hawaii	9	7	16
Puerto Rico	57	22	79
Virgin Islands	1	1	2
Totals	67	36	103
Grand Totals	6,155	1,654	7,809

Graduates of Unapproved Medical Schools Registered, 1953-1958

Recorded in table 16 are data regarding graduates of institutions that have not been approved by the Council on Medical Education and Hospitals of the American Medical Association. Figures are given for those licensed after written examination and those licensed by endorsement of credentials. The table also includes a column combining the figures for these two groups. They represent graduates of five unapproved medical schools, all but one of which are now extinct. The latter institution has obtained the status of an approved school. There were 240 graduates of unapproved medical schools registered from 1953 to 1958 inclusive, 79 by examination and 161 by endorsement of credentials. California, Florida, New York, and Texas licensed the greatest number of graduates of unapproved medical schools. Twenty-seven state boards were represented in the six-year period. In 1958, there were 32 licensed by 13 boards, 6 by examination, and 26 by reciprocity or endorsement. The numbers of such graduates appearing for licensure is steadily decreasing.

TABLE 13.—*Licentiates Representing Additions to the Medical Profession, 1935-1958*

Year	Examination	Reciprocity and Endorsement	Total
1935	5,099	411	5,510
1936	5,548	629	6,177
1937	5,812	612	6,424
1938	5,759	501	6,260
1939	5,581	460	6,041
1940	5,432	455	5,887
1941	5,241	474	5,715
1942	5,560	454	6,014
1943	5,586	372	5,958
1944	6,495	470	6,695
1945	4,979	769	5,748
1946	5,362	1,608	6,970
1947	5,273	1,617	6,890
1948	4,942	1,694	6,636
1949	4,260	1,616	5,876
1950	4,609	1,393	6,002
1951	4,985	1,288	6,273
1952	5,168	1,717	6,885
1953	5,388	1,888	7,276
1954	5,897	2,020	7,917
1955	*6,211*	*1,526*	7,737
1956	6,035	1,428	7,463
1957	5,872	1,583	7,455
1958	6,155	1,654	7,809
Totals	131,252	26,639	157,891

Graduates of Schools of Osteopathy Registered by Medical Examining Boards, 1953-1958

The number of graduates of schools of osteopathy granted the privilege of practicing medicine or surgery or both by 18 licensing boards from 1953 to 1958, inclusive, is given in table 17. There have been 1,708 such persons registered, 1,171 by examination and 537 without written examination. In 1958, 14 boards licensed osteopathic physicians to practice. Two boards licensed these graduates after examination only, and 4 licensed them only on the basis of reciprocity, while 8 boards licensed them after both methods. Following is a summary of the actions and regulations of the 18 boards providing for the licensing of osteopaths by the medical examining board.

In Colorado an osteopath receives a license to practice medicine and must meet the same requirements as for doctors of medicine. In Connecticut an osteopath registered by the osteopathic board may be licensed to practice medicine and surgery or both after examination by the medical examining board. Osteopaths in Delaware may be licensed as osteopathic physicians after successfully passing the examination of the medical board, except that the principles of osteopathy is given in the examination in place of materia medica.

TABLE 14.—*Registration of Physicians, 1904-1958*

Year	Examined	Passed	% Failed	Reciprocity or Endorsement	*Total* Registered
1904	7,056	5,693	19.3	1,005	6,698
1905	7,178	5,688	20.8	394	6,082
1906	8,010	6,373	20.7	1,502	7,875
1907	*7,279*	5,731	*21.3*	*1,427*	*7,158*
1908	7,775	6,089	21.7	1,284	7,373
1909	7,295	5,865	19.6	1,381	7,246
1910	7,011	5,719	18.4	1,640	7,359
1911	6,964	5,582	19.8	1,243	6,825
1912	6,880	5,467	20.5	1,273	6,740
1913	6,453	5,253	18.6	1,292	6,545
1914	5,579	4,379	21.5	1,439	5,818
1915	5,331	4,507	15.5	1,399	5,906
1916	4,878	4,151	14.9	1,353	5,504
1917	4,754	4,085	14.0	1,360	5,445
1918	3,657	3,184	13.2	1,047	4,231
1919	4,750	4,074	14.2	2,546	6,620
1920	4,796	4,062	15.3	2,558	6,620
1921	4,825	4,228	12.4	2,186	6,414
1922	4,031	3,539	12.2	2,073	5,612
1923	4,727	4,028	14.8	2,405	6,433
1924	5,392	4,756	11.8	1,923	6,679
1925	6,002	5,450	9.2	1,861	7,311
1926	5,770	5,314	7.9	1,955	7,269
1927	5,389	5,002	7.2	2,176	7,178
1928	5,458	5,090	6.7	2,228	7,318
1929	5,629	5,282	6.2	2,420	7,702
1930	5,571	5,255	5.7	2,366	7,621
1931	5,611	5,263	6.2	2,211	7,476
1932	5,675	5,247	7.6	1,886	7,133
1933	5,673	5,244	7.6	1,989	7,233
1934	6,145	5,628	8.4	2,161	7,789
1935	6,443	5,859	9.1	2,194	8,053
1936	6,918	6,224	10.0	2,773	8,997
1937	7,334	6,604	10.0	3,205	9,809
1938	7,461	6,589	11.7	2,956	9,545
1939	7,754	6,493	16.3	2,872	9,365
1940	7,926	6,291	20.7	2,866	9,157
1941	7,539	6,057	19.7	2,762	8,819
1942	7,223	6,120	15.4	2,469	8,589
1943	8,403	7,489	10.9	2,340	9,829
1944	6,817	6,011	11.8	2,596	8,607
1945	*5,930*	5,343	*9.9*	3,622	8,965
1946	7,610	6,856	9.9	9,669	16,525
1947	7,164	6,414	10.5	7,701	14,115
1948	6,624	5,904	10.8	7,595	13,499
1949	5,963	5,219	12.5	6,929	12,148
1950	6,203	5,481	11.6	6,755	12,236
1951	6,473	5,716	11.7	6,225	11,941
1952	7,028	6,229	11.3	7,016	13,245
1953	7,425	6,543	13.0	7,869	14,412
1954	8,066	7,033	12.7	8,202	15,235
1955	*8,501*	*7,400*	*12.9*	7,461	15,962
1956	8,342	7,179	13.9	7,421	14,600
1957	9,116	7,769	14.8	7,486	15,255
1958	8,633	7,268	15.8	7,925	15,193

The District of Columbia will permit any person engaged in the practice of osteopathy on or before Jan. 1, 1948, to file application for a license to practice osteopathy and surgery. To obtain such a license, an osteopath must pass all subjects of the medical examination and in addition must pass subjects in the practice of osteopathy. Osteopaths are eligible for licensure also by endorsement of the certificate issued by the National Board of Osteopathic Medical Examiners.

Since 1950, in Illinois, graduates of the Chicago College of Osteopathy are examined by the medical board and may receive medical licenses. In Indiana, under an amendment to the medical practice act in 1945, osteopaths are permitted to practice medicine, surgery, and obstetrics and to administer anesthetics, antiseptics, and narcotics. Persons who were licensed in osteopathy before 1945 may obtain from the medical board a license to practice osteopathy, surgery, and obstetrics.

TABLE 15.—*Graduates of Approved Schools and Others Registered, 1922-1958*

	Graduates of Approved Schools		Others		
Year	No.	Percentage of Total	No.	Percentage of Total	Totals
1922	4,519	80.5	1,093	19.5	5,612
1923	5,196	80.8	1,237	19.2	6,433
1924	5,687	85.1	992	14.9	6,679
1925	6,314	86.4	997	13.6	7,311
1926	6,441	88.7	828	11.3	7,269
1927	6,410	89.4	768	10.6	7,178
1928	6,585	90.1	733	9.9	7,318
1929	7,003	91.0	699	9.0	7,702
1930	7,011	92.1	610	7.9	7,621
1931	6,932	92.8	544	7.2	7,476
1932	6,676	92.1	457	6.3	7,133
1933	6,774	93.7	459	6.3	7,233
1934	7,172	92.1	617	7.9	7,789
1935	7,360	91.3	693	8.5	8,053
1936	7,934	88.1	1,063	11.8	8,997
1937	8,391	85.5	1,418	14.4	9,809
1938	8,315	87.1	1,230	12.9	9,545
1939	8,067	86.2	1,298	13.8	9,365
1940	7,781	85.0	1,376	15.0	9,157
1941	7,770	87.9	1,049	11.9	8,819
1942	7,290	84.9	1,299	15.1	8,589
1943	8,640	87.9	1,189	12.2	9,829
1944	7,737	89.8	870	10.1	8,607
1945	8,233	91.8	732	8.1	8,965
1946	15,692	94.9	835	5.1	16,527
1947	13,097	93.0	1,018	7.0	14,115
1948	12,791	94.8	708	5.2	13,499
1949	11,378	93.7	770	6.3	12,148
1950	11,502	94.0	734	6.0	12,236
1951	11,027	92.3	914	7.7	11,941
1952	12,198	92.1	1,047	7.9	13,245
1953	13,189	91.5	1,223	8.5	14,412
1954	13,814	90.7	1,421	9.3	15,235
1955	13,344	89.8	1,517	10.2	14,861
1956	13,146	90.0	1,454	10.0	14,600
1957	13,330	87.4	1,925	12.1	15,255
1958	13,097	86.2	2,096	13.8	15,193
Totals	337,843	89.9	37,913	10.1	375,756

Special examination and licensure is provided by the Healing Arts Act passed in Kansas in 1957. An osteopathic physician having graduated from an approved college of osteopathy after June 1, 1950, and who holds a valid license to practice osteopathy is eligible for licensure. Any person who on Jan. 1, 1957, was licensed to practice osteopathy and who on said date maintained an office and was actively engaged in the practice of osteopathy in Kansas may, if application is made prior to July 1, 1960, take a special examination.

In Massachusetts, for the purposes of registration, the D. O. degree is considered equivalent to the M.D. degree and applicants for licensure must meet the same requirements as M.D.'s. In New Hampshire, under the provisions of the medical practice act, osteopaths are granted the right to practice medicine and surgery. The New Jersey medical practice act provides that an osteopath licensed prior to Nov. 1, 1941, who has served for a period of two years as an intern or resident surgeon in an approved osteopathic or medical hospital, has completed a postgraduate course of two years in a college of osteopathy or medicine approved by the board, or has had at least three years of practice in a hospital approved by the board, can be admitted to an examination in pharmacology, therapeutics, and surgery. If successful, he can obtain a license to practice medicine and surgery.

In New York, a licensed osteopath who is an applicant for the right to use instruments for minor surgical procedures and to use anesthetics, antiseptics, narcotics, and biological products may be granted the right to practice medicine without limitation if his credentials satisfy the Board of Regents. If not, such applicants shall be required either to pursue further study or to pass a special examination.

The Ohio Medical Practice Act was amended in 1943 to provide that all graduates from osteopathic schools applying for the right to practice in the state must meet certain educational requirements and must pass certain examinations. One of the required examinations is in surgery. Those who qualify and pass all of the examinations are then given a license to practice osteopathic medicine and surgery. Those in practice and licensed under a more limited law in effect prior to 1943 can secure a license to practice osteopathic medicine and surgery by meeting certain additional requirements, including postgraduate work and the passing of additional examinations.

In Oregon, osteopaths who meet certain requirements are granted the right to practice in the subjects covered by the medical examination, with the exception of the practice of medicine or materia medica and therapeutics. In South Dakota, osteopaths may be licensed to practice medicine, surgery, and obstetrics. This is an unrestricted license. Texas issues only one license, which is unrestricted in scope.

In Virginia, two classes of osteopaths are licensed. If a candidate takes the same examination as an M.D., substituting the practice of osteopathy for the practice of medicine, he is licensed to practice osteopathy with the use of surgery and drugs. However, if he takes an examination without the subjects of surgery and materia medica, he is licensed to practice osteopathy without the use of drugs or surgery.

The Wisconsin law, amended in 1950, provides that an osteopath, licensed in the state may obtain a license to practice medicine and surgery by completing a refresher course in materia medica and pharmacology consisting of not less than 64 hours of lecture and 60 hours of laboratory work and by passing an examination in these subjects. Osteopaths not licensed in the state may apply to take the same examination as physicians. If successful, they will be granted licenses to practice medicine and surgery. In Wyoming, the statutes contain no specific provision for the licensing of osteopaths. The medical practice act provides that the certificate issued to all physicians shall be deemed a license to practice medicine in all branches in which the applicant has taken an examination.

Enactment and Operation of Medical Practice Act

An attempt was made this year to obtain from each licensing board the year when the first medical practice act was enacted and the year when the first examining board was established under the medical practice act. These data are given in table 18. Not all states were able to provide this information. It is to be hoped that this table can be presented in more complete form when next this study is made.

Preprofessional Training Requirements of Licensing Boards

In order to provide an opportunity for medical students to gain a broad educational background, the Council on Medical Education and Hospitals of the American Medical Association recommends four years of preprofessional college training. Since January, 1953, the minimum requirement for admission to an approved medical school has been three years of college work, with the provision that rarely and only under exceptional circumstances will an approved medical school be justified in admitting a superior student with only two years of college preparatory work.

The preprofessional requirements of medical licensing boards are indicated in table 19. Seven boards specify that no preprofessional requirement is mentioned in the medical practice act. Twenty-one boards reported a three-year requirement. In others, the law specifies at least two years of college work. No board specifies in detail the number of hours that must be devoted to the subjects of the preprofessional curriculum, although 19 boards report that this training must include certain subjects, such as English, physics, chemistry, biology, and a foreign language. The candidates appearing for medical licensure are graduates of all years, and the seeming lack of conformity with accepted standards as promulgated by the Council on Medical

TABLE 16.—*Graduates of Unapproved Medical Schools Registered 1953-1958*

	Examination							Reciprocity and Endorsement							Combined Totals
	1953	1954	1955	1956	1957	1958	Totals	1953	1954	1955	1956	1957	1958	Totals	
Arizona	..	..	..	..	..	..	..	..	1	..	..	1	..	2	2
Arkansas	..	..	..	..	..	..	..	..	..	..	..	2	1	3	3
California	..	..	..	..	..	..	..	8	19	15	2	5	11	60	60
Delaware	..	..	..	..	..	..	..	..	..	1	..	1	..	2	2
District of Columbia	..	..	..	..	..	..	..	..	..	..	1	1	1	3	3
Florida	5	8	7	4	5	1	30	..	..	..	..	..	..	..	30
Georgia	1	2	..	..	..	..	3	1	..	..	..	..	1	2	5
Idaho	..	..	..	..	..	..	..	1	..	..	..	1	..	2	2
Illinois	..	..	..	..	..	..	..	..	2	4	..	..	..	6	6
Iowa	..	..	..	..	..	..	..	..	1	1	..	..	..	2	2
Maine	..	..	1	..	..	..	1	..	..	1	..	..	..	1	2
Massachusetts	2	5	1	..	..	1	9	..	..	..	..	..	..	..	9
Michigan	..	..	..	..	..	..	..	..	1	..	1	1	1	4	4
Missouri	..	..	..	..	..	..	..	2	1	..	1	1	..	5	5
New Hampshire	..	..	..	..	..	..	..	..	..	..	1	..	..	1	1
New Jersey	3	1	..	..	..	..	4	..	..	..	4	1	..	5	9
New York	3	3	1	5	2	2	16	..	..	..	1	..	..	1	17
Ohio	..	..	3	..	..	..	3	1	3	..	..	..	..	4	7
Pennsylvania	..	..	..	..	..	2	2	1	..	1	..	..	..	2	4
South Carolina	..	..	..	..	2	..	2	..	..	..	..	..	..	..	2
South Dakota	..	..	1	..	..	..	1	..	..	..	..	..	..	..	1
Tennessee	..	..	..	..	..	..	..	1	..	..	..	..	1	1	2
Texas	..	..	..	..	..	..	..	9	7	3	8	11	4	42	42
Virginia	2	..	..	..	..	..	2	..	..	..	..	..	..	..	2
Washington	..	..	..	..	..	..	..	..	..	..	..	1	2	3	3
West Virginia	3	..	..	..	..	..	..	..	..	..	..	..	..	..	3
Wisconsin	..	..	..	..	..	..	..	..	..	1	1	2	4	8	8
Territories and Possessions	1	2	..	..	..	..	3	..	1	..	..	..	..	1	4
Totals	20	21	14	9	9	6	79	24	36	27	20	28	26	161	240

TABLE 17.—*Graduates of Schools of Osteopathy Registered by Medical Boards, 1953-1958*

	Examination							Reciprocity and Endorsement							Combined Totals
	1953	1954	1955	1956	1957	1958	Totals	1953	1954	1955	1956	1957	1958	Totals	
Colorado	8	3	7	1	5	..	21	15	22	16	12	9	15	89	113
Connecticut	2	3	..	..	..	..	5	..	..	..	..	..	..	..	5
Delaware	1	..	2	3	1	..	7	4	1	2	..	1	1	9	16
District of Columbia	..	..	..	..	..	1	1	..	1	1	..	..	..	2	3
Illinois	..	..	14	10	2	6	32	..	..	..	11	..	..	11	43
Indiana	5	2	6	2	5	6	26	10	11	9	..	9	12	51	77
Kansas	..	..	..	..	144	16	160	..	..	..	..	..	4	4	164
Massachusetts	..	1	..	..	..	..	1	1	2	5	4	4	6	22	23
New Hampshire	..	..	..	..	1	1	2	3	1	3	1	2	1	11	13
New Jersey	11	7	8	6	9	2	43	10	18	7	28	10	45	118	161
New York	47	44	92	42	44	35	304	4	1	1	4	..	3	13	317
Ohio	64	81	73	63	66	66	413	20	13	2	13	10	3	61	474
Oregon	..	..	..	..	..	..	..	1	..	..	2	..	..	3	3
South Dakota	..	1	..	..	..	..	1	..	..	..	..	..	..	..	1
Texas	32	46	25	9	3	5	120	16	13	10	13	32	43	127	247
Virginia	..	..	..	..	..	..	..	1	1	..	..	..	..	2	2
Wisconsin	7	7	6	6	4	2	32	..	1	1	3	3	2	10	42
Wyoming	..	..	..	..	..	..	..	..	..	1	..	..	3	4	4
Totals	177	195	233	142	284	140	1,171	85	85	58	91	80	138	537	1,708

Education and Hospitals of the American Medical Association and the Association of American Medical Colleges is due to the fact that initiation of the current three-year minimum requirement for all candidates appearing for licensure would eliminate many graduates of earlier years. In practice, the boards in granting licensure to a graduate of an approved medical school accept the premedical training required in the year the candidate was admitted to a medical school.

TABLE 18.—*Enactment and Operation of Medical Practice Act*

State	First Medical Practice Act Enacted	First Examining Board Established Under Medical Practice Act
Alabama	1823	1877
Alaska	..	..
Arizona	1913	1913
Arkansas	..	..
California	1876	1876
Canal Zone	1911	1911
Colorado	..	..
Connecticut	1878	1878
Delaware	1895	1895
District of Columbia	1896	1896
Florida	..	1921
Georgia	1913	..
Guam	..	..
Hawaii	..	..
Idaho	..	..
Illinois	1877	1917*
Indiana	..	..
Iowa	1886	1886
Kansas	1901	1901
Kentucky	1874	1878
Louisiana	..	..
Maine	..	..
Maryland	1888	1892
Massachusetts	1894	1894
Michigan	..	..
Minnesota	1883	1883
Mississippi	1819	1819
Missouri	1903	1903
Montana	1889	1893
Nebraska	1891	1891
Nevada	1899	1899
New Hampshire	1915	1915
New Jersey	1890	1890
New Mexico	..	..
New York	1891	1891
North Carolina	1859	1859
North Dakota	1890	1890
Ohio	1896	1896
Oklahoma	1908	1908
Oregon	1889	1899
Pennsylvania	1911	1912
Puerto Rico	..	..
Rhode Island	1895	1895
South Carolina	1817	1817
South Dakota	..	..
Tennessee	1901	1901
Texas	1837	1907
Utah	1921	1921
Vermont	..	..
Virgin Islands	..	..
Virginia	..	..
Washington	1890	1890
West Virginia	1881	1915*
Wisconsin	1897	1897
Wyoming	1899	1899

* Administered by State Board of Health until date given. Not reported.

Approval of Medical Schools

Seven licensing boards maintain their own list of approved medical schools in the United States and Canada. Twenty-six boards require applicants for licensure from approved medical schools in the United States or Canada to be graduates of medical schools approved by the Council on Medical Education and Hospitals. Two boards require membership in the Association of American Medical Colleges. Twenty boards specify that schools must be approved by the Council and be in membership in the Association of American Medical Colleges. In 16 instances the requirement is specified in the medical practice act, 37 boards reported that it is a formal regulation, and 2 indicated that it was an informal policy. In actuality, all approved medical schools are both approved by the Council and in membership in the Association of American Medical Colleges.

Required Internships

One year of internship, as a prerequisite to licensure, is required by the licensing boards of 32 states, the District of Columbia, Canal Zone, Guam, Hawaii, Puerto Rico, and the Virgin Islands. Nine boards specify that the internship must be a rotating service. Rhode Island will accept a straight internship if it is a part of a three-year approved residency. New Jersey reports that a one-year rotating service, or two years of straight internship, or a two-year residency in a specialty will meet the requirement of hospital service. Postgraduate training is accepted in lieu of deficiencies in the requirement of a rotating internship in Alaska after seven years from the date of graduation from medical school. Missouri requires the internship for reciprocity applicants only. Those licensing boards that require an internship as a prerequisite for licensure are listed in table 20.

TABLE 19.—*Requirements of Preprofessional Training by Medical Licensing Boards*

Two Years or More of College

Alabama[1]
Alaska[5]
Arizona[2]
Arkansas
California[3]
Canal Zone
Colorado[1]
Connecticut[4]
Delaware[5]
District of Columbia
Florida[6]
Georgia
Guam
Hawaii
Idaho
Illinois
Indiana[7]
Iowa[1]
Kansas
Kentucky
Louisiana[6]
Maine
Maryland
Massachusetts[7]
Michigan[6]
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada[1]
New Hampshire
New Jersey[5]
New Mexico[1]
New York[8]
North Carolina[6]
North Dakota
Ohio
Oklahoma[1]
Oregon
Pennsylvania[8]
Puerto Rico
Rhode Island
South Carolina[5]
South Dakota[6]
Tennessee
Texas
Utah[6]
Vermont[6]
Virgin Islands[6]
Virginia
Washington[7]
West Virginia
Wisconsin[6]
Wyoming[1]

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1. Not specified by law.
2. Entrance requirement prescribed by accrediting agencies.
3. Three years for applicants matriculating after Jan. 1, 1954.
4. One year prior to 1919, two years subsequent to 1947, including courses in physics, chemistry, and biology.
5. Premedical training must include courses in physics, chemistry, biology, English, and a foreign language.

6

7 ysics, chemistry, and biology must be

8 lude courses in English, physics, chemistry (general and organic), and biology.

Temporary and Educational Permits, Limited and Temporary Licenses, or Other Certificates Issued by State Licensing Boards

Thirty-eight boards provide for the issuance of temporary and educational permits, limited and temporary licenses, or other certificates. The terms for the issuance of such certificates vary. This limited registration may apply to hospital training, to those ineligible for licensure who seek further educational training, or for regular practice until the next regular session of the licensing board. A list of these states and information on the length of validity of this special registration are shown in table 21.

Licensure Requirements for Interns and Residents in Hospitals

In general, physicians serving internships are not required to be licensed in the state in which the hospital where they are interning is located. Indiana and Puerto Rico have such a requirement. Delaware, the District of Columbia, and New Jersey permit a service of two years without licensure, and Florida permits a three-year service before licensure. Other boards have a requirement of registration with the licensing board or a stipulation that the physician must be eligible for licensure. The states which require some form of registration for interns are listed in table 22.

Thirty-one boards require that physicians serving residencies in hospitals must be licensed or registered in the state. Twenty-three boards stipulate that registration must be in the form of a regular license or a temporary certificate for the term of the residency. Seven boards do not require licensure but stipulate some form of registration with the licensing board. The regulations of each of the licensing boards that exact some requirement of those engaged in residency training are given in table 23.

TABLE 20.—*Medical Licensing Boards Requiring One-Year Internship*

Alabama
Alaska[4]
Arizona
California
Canal Zone
Colorado
Delaware
District of Columbia
Guam
Hawaii
Idaho
Illinois[1]
Iowa
Kansas
Kentucky
Louisiana[1]
Maine
Michigan
Missouri[2]
Montana
Nevada
New Hampshire
New Jersey[3]
North Dakota[1]
Oklahoma
Oregon
Pennsylvania[1,4]
Puerto Rico[1]
Rhode Island[5]
South Carolina
South Dakota
Utah
Vermont[1]
Virgin Islands[1]
Washington[1]
West Virginia
Wisconsin
Wyoming[1]

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1. Internship must be a rotating service.
2. For reciprocity applicants.
3. One year rotating service or two years of straight internship or two-year residency in a specialty.
4. After seven years from date of graduation from medical school, postgraduate training accepted in lieu of deficiencies in a rotating internship.
5. Straight internship accepted if part of a three-year approved residency.

TABLE 21.—*Temporary and Educational Permits, Limited and Temporary Licenses, or Other Certificates Issued by State Licensing Boards*

Alaska	Temporary permits issued while processing permanent licensure to summer cannery physicians and to physicians in the armed forces on short periods with private physicians and for locum tenens work.
Arizona	Temporary permits issued on basis of community emergency.
Arkansas	Temporary permits are granted reciprocity applicants until regular board meeting.
Connecticut	Educational permits granted to graduates of unapproved medical schools to serve in approved hospital training programs.
Delaware	Temporary emergency license upon proved emergency, one year, subject to renewal, and for locum tenens practice (2 to 4 months).
Georgia	Permit until board meets. Permits for aliens to practice in state institutions or medical schools.
Guam	Restrictive certificate to permit medical employees of federal contractors to practice in the discharge of their official duties.
Idaho	To candidates holding certificate of National Board of of Medical Examiners or licensed by written examination in another state until next meeting of board and to residents in hospitals.
Illinois	Temporary certificates for residency training for applicants who are not qualified for permanent registration. Permit issued for service in state hospitals to physicians eligible for licensure.
Indiana	Temporary license pending next examination for graduates of approved medical schools. Temporary reciprocal license for six months.
Iowa	Resident physicians licenses are issued for a period of not more than seven years for service in a hospital approved by the board.
Kansas	Temporary permit until next board meeting providing application is in proper form for license.
Kentucky	Temporary permits issued to applicants by endorsement for six-month period to serve until investigations completed and meeting of board. Limited licenses for one year, renewable for special place, purpose, and time.
Louisiana	[illegible] to physicians possessing [illegible] file application for examination [illegible] Louisiana between the [illegible] meetings of the board. [illegible] next meeting of the board.
Maine	Temporary licenses granted for residency training for one year. Must be an American citizen and a graduate of an approved medical school.
Massachusetts	Limited registration covering appointment as intern, resident, or fellow in a specific hospital or as assistant in medicine while a student in medical school.
Michigan	Temporary license for residency and postgraduate training program renewable annually not to exceed five years.
Minnesota	Limited license for duration of residency.
Mississippi	Temporary permit for practice until next board meeting pending permanent license.
Montana	In unusual circumstances only.
Nevada	Temporary permit for one year for residency training.
New Hampshire	Temporary license for five years to foreign physicians. Permanent license issued upon becoming citizen of the United States.
New Jersey	Temporary license for four months may be renewed at monthly intervals not to exceed one year.
New Mexico	Institutional permits for practice in state hospitals only. Temporary permits issued until next board meeting.
New York	Temporary certificate for two years for residency training except in state, mental and municipal hospitals.
North Carolina	Limited license issued for duration of residency.
North Dakota	Temporary permit for United States and Canadian graduates until next board examination.
Oklahoma	Temporary licenses for one year for residency training in approved hospitals.
Pennsylvania	Postgraduate certificate issued for residency training if licensed in any state or territory or the United States or Canada or hold the certificate of the National Board of Medical Examiners.
Puerto Rico	Special permit may be granted.
Rhode Island	Temporary permit for one year for interns, residents, and house officers in hospitals.
South Carolina	Temporary permits for interns and residents renewable annually not to exceed five years.
South Dakota	Temporary license issued for graduates of foreign medical schools for four years for practice in emergency medical areas for a period of four years before permanent license is issued.
Texas	Temporary permit issued until next board meeting.
Virginia	Temporary permit issued until next board meeting for reciprocity applicants.
Virgin Islands	Temporary certificates issued to military service personnel on duty and to municipal personnel until next license examination.
West Virginia	Temporary permits issued until next board meeting to qualified applicants.
Wisconsin	Temporary educational permit for graduates of foreign medical schools not recognized by board for licensure.

Schedule of Written Examination Dates and Reciprocity Meetings

The schedules of dates for written examination and meetings or oral examination for the issuance of licenses by reciprocity or by endorsement of credentials is given in table 24. In most instances, written examinations are scheduled twice annually and reciprocity meetings quarterly or as soon as the application for licensure can be processed. In those states requiring a basic science certificate for licensure, dates of the examination or reciprocity meetings are arranged to coincide closely with the examination and meeting dates of the boards of examiners in the basic sciences.

TABLE 22.—*Licensure, Registration, or Other Requirements for Interns*

Licensure	Other Requirements
Indiana	Colorado[6]
Puerto Rico	Delaware[2]
	District of Columbia[2]
	Florida[1]
	Massachusetts[3]
	New Jersey[2]
	Rhode Island[5]
	South Carolina[5]
	Texas
	Virginia[4]
	West Virginia[4]

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[1] Must register every six months with State Board of Health and may serve for a period of three years without licensure.

[2] May serve for two years without licensure.

[3] Limited registration granted.

[4] Graduates of unapproved foreign medical schools must obtain permission from board.

[5] Temporary permit required.

[6] May serve for an aggregate period not to exceed four years; required to register with licensing board annually.

Medical Licensure Fees

Table 25 lists for each licensing board the fee charged for registration by examination and also by reciprocity or endorsement of credentials. The examination boards tend to be uniform, the majority of the boards charging a fee of $25. The fee for a license without examination varies from $5 to $200. Three states have a lower fee for those being certified on the basis of the certificate of the National Board of Medical Examiners than for candidates licensed by endorsement of state license. One state exacts the same fee as the reciprocating state fee for such a license.

Licensure on Government Credentials

Few states have provision in their medical practice act for the acceptance of credentials issued by the federal government or the armed services as a basis for licensure without examination. Nine boards —Alabama, Arizona, California, Delaware, Illinois, Pennsylvania, Texas, Utah, Vermont, and Wisconsin —have indicated that in their discretion they may accept such credentials under varying regulations.

Annual Registration

Forty boards require physicians to register their licenses annually or biennially. This requirement applies in some states whether or not the physician is engaged in practice in the state. In table 26 are listed the licensing boards that exact this requirement and the fee charged for such registration. The fee ranges from $1 to $10. Five states have a nonresident fee. Guam does not charge a fee. In Florida physicians are required to register with the state board of health, while New York, North Carolina, and West Virginia require biennial registration.

Citizenship Requirements for Permanent Licensure

Table 27 lists the United States citizenship requirements for permanent licensure by the 55 licensing boards of the United States and its territories and possessions. Eight boards have no citizenship requirement, 17 states require that the applicant declare his intention of becoming a citizen, and 30 states require full citizenship.

TABLE 23.—*Licensure, Registration, or Other Requirements for Residents*

Licensure or Temporary Registration Required	Other Requirements
Arkansas	Colorado[9]
California[1]	Delaware[15]
Connecticut[2]	District of Columbia[13]
Idaho	Florida[10]
Illinois[3]	Mississippi[1]
Indiana	New Jersey[13]
Iowa[11]	Virginia[12]
Maine[4]	West Virginia[13]
Massachusetts[5]	
Michigan[14]	
Minnesota[6]	
Nevada[4]	
New York[7]	
North Carolina[6]	
Oklahoma[4]	
Pennsylvania[8]	
Puerto Rico	
Rhode Island[4]	
South Carolina[14]	
South Dakota	
Texas	
Washington	
Wisconsin	

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[1] May serve one year without licensure.

[2] May be required by hospitals.

[3] Applicants who wish to serve residencies in Illinois hospitals and who are not eligible for permanent registration may apply for temporary certificates which are issued without examination. Also permits to practice in State hospitals to applicants qualified for examination.

[4] Temporary license for one year.

[5] Limited registration granted.

[6] Limited license for duration of residency.

[7] Temporary certificate for two years for residents, except in state mental and municipal hospitals.

[8] Postgraduate certificate issued for residency training if licensed in any state or territory of the United States or Canada or hold the certificate of the National Board of Medical Examiners.

[9] May serve for an aggregate period not to exceed four years. Required to register with licensing board annually.

[10] Three years without licensure. Must register every six months with board of health.

[11] Resident physician's licenses are issued for a period of not more than seven years for service in a hospital approved by the board.

[12] Graduates of unapproved foreign medical schools must obtain permission from board.

[13] May serve two years without licensure.

[14] Temporary license for residency and postgraduate training renewable annually not to exceed five years.

[15] Registration with licensing board required.

Registration Policies for Citizens of Canada by Licensing Boards in the United States

The licensing boards of the United States and its territories and possessions have reported that they will accept graduates of approved medical schools of Canada for licensure by examination on the same basis as graduates of approved medical schools of the United States. Table 28 records the registration policies for citizens of Canada. Few states indicate that they will accept Canadian registration for licensure by reciprocity or endorsement. Modifications are made in the citizenship requirement for candidates from Canada. This table shows for each state whether United States citizenship is a requirement, whether the candidate must declare his intention of becoming a citizen, and if no citizenship requirement is exacted.

Licensure of Foreign-Trained Physicians

Since 1950, the Council on Medical Education and Hospitals of the American Medical Association and the Executive Council of the Association of American Medical Colleges have published a list of foreign medical schools whose graduates are recommended for consideration on the same basis as graduates of approved medical schools in the United States and Canada. This list has always been offered as an advisory list for the use of state licensing boards, hospitals, specialty boards, and other organizations in the United States concerned with the evaluation of medical credentials and qualifications of graduates of foreign medical schools. These same organizations have always been advised that the list was acknowledged to be a tentative one and that the position of the Councils with respect to the foreign medical schools not listed has been that they neither approve nor disapprove of them.

TABLE 24.—*Schedule for Written Examination and Issuance of Licenses by Reciprocity or Endorsement of Credentials*

	Written Examinations	Licenses by Reciprocity or Endorsement Issued
Alabama	Annually	Continuously
Alaska	On application	On application
Arizona	Quarterly	Quarterly
Arkansas	June and November	June and November
California	Quarterly	Continuously
Canal Zone	On application	On application
Colorado	Twice annually	Quarterly
Connecticut	March, July, and November	Continuously
Delaware	January and July	January and July
District of Columbia	Twice annually	Quarterly
Florida	June and November	No Reciprocity
Georgia	June and October	June and October
Guam	On application	On application
Hawaii	January and July	Continuously
Idaho	Twice annually	Twice annually
Illinois	Quarterly	Quarterly
Indiana	Annually, June	Approximately eight times annually
Iowa	Twice annually	*Monthly*
Kansas	January and June	January and June
Kentucky	Semiannually	Every two months
Louisiana	June and December	June and December
Maine	March, July, and November	March, July, and November
Maryland	June and December	Monthly
Massachusetts	January and July	Monthly except August
Michigan	*June and October*	*Continuously*
Minnesota	Quarterly	Quarterly
Mississippi	Annually in June	June and December
Missouri	Three times annually	Six times annually
Montana	Semiannually	Semiannually
Nebraska	Annually in June	Continuously
Nevada	Quarterly	Quarterly
New Hampshire	Twice annually	Twice annually
New Jersey	June and October	Monthly except August
New Mexico	Twice annually	Twice annually
New York	June and December	Continuously
North Carolina	Annually	Five times annually
North Dakota	January and July	January and July
Ohio	June and December	January, April, July, and October
Oklahoma	Annually	Quarterly
Oregon	January and July	Quarterly
Pennsylvania	January and July	Every six weeks
Puerto Rico	Twice annually	Continuously
Rhode Island	Quarterly	Four times annually; special meetings
South Carolina	Twice annually	Three times annually
South Dakota	Twice annually	Continuously
Tennessee	Quarterly	Continuously
Texas	Twice annually	Quarterly
Utah	Once annually	February, June, August, and November
Vermont	January and June	Continuously
Virgin Islands	Twice annually	Twice annually
Virginia	Twice annually	Twice annually
Washington	Twice annually	Twice annually
West Virginia	January and July	Quarterly
Wisconsin	January and July	Quarterly
Wyoming	Three times annually	Three times annually

TABLE 25.—*Medical Licensure Fees*

	Examination	Reciprocity or Endorsement
Alabama	$ 50	$ 50
Alaska	35	110
Arizona	25	100
Arkansas	50	100
California	25	100
Canal Zone	10	5
Colorado	25	50
Connecticut	35	75
Delaware	25	100
District of Columbia	25	50[a]
Florida	50	..
Georgia	20	50
Guam	50	50
Hawaii	50	50
Idaho	25	100
Illinois	75	200
Indiana	25	100
Iowa	25	50
Kansas	50	[b]
Kentucky	50	75
Louisiana	25	15
Maine	27	52
Maryland	35	100
Massachusetts	25	50
Michigan	50	100
Minnesota	25	100
Mississippi	10	50
Missouri	25	100
Montana	50	75
Nebraska	25	50
Nevada	100	200
New Hampshire	30	50
New Jersey	50	100
New Mexico	50	50
New York	40	40
North Carolina	50	100
North Dakota	50	50
Ohio	25	50
Oklahoma	25	100
Oregon	25	100[c]
Pennsylvania	25	50
Puerto Rico	30	30
Rhode Island	20	20
South Carolina	25	100
South Dakota	20	50
Tennessee	35	50[d]
Texas	50	100
Utah	25	50
Vermont	20	50
Virgin Islands	65	..
Virginia	25	100
Washington	25	50
West Virginia	25	100
Wisconsin	50	100
Wyoming	50	50

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[a] Endorsement of certificate of National Board of Medical Examiners, $25.

[b] Same as reciprocating state fee for such a license.

[c] Endorsement fee, $50.

[d] Endorsement of certificate of National Board of Medical Examiners, $10.

In the years since the initial publication of this list, the number of graduates of foreign medical schools coming to the United States on either temporary or permanent visas has increased tremendously. The vast majority of physicians now entering this country either for further study as interns or residents or for permanent stay and medical licensure have received their medical degrees from medical schools other than those listed.

TABLE 26.—*States Requiring Annual Registration*

State	Fee	State	Fee
Arizona	$ 5.00	Nebraska	$ 3.00
Alaska	10.00	Nevada	10.00
Arkansas	a	New Mexico	e
California	1 00	New York*	6.00
Colorado	b	North Carolina*	5 00
Connecticut	2.00c	North Dakota	5.00
District of Columbia	4 00	Oklahoma	5.00
Florida	1.00c	Oregon	f
Georgia	3.00	Pennsylvania	1.00
Guam	None	Rhode Island	1.00
Hawaii	5.00	South Dakota	2.00
Idaho	10.00	Tennessee	5.00
Illinois	6.00	Texas	5.00
Indiana	d	Utah	3.00
Iowa	3.00	Vermont	2.00
Kansas	5.00	Virginia	1.00
Louisiana	10.00	Washington	7.00
Minnesota	3 00	West Virginia*	2.00
Missouri	5.00	Wisconsin	3.00
Montana	5 00	Wyoming	2.50

* Biennial Registration.
a. Residents $2, nonresidents $4.
b. Residents $2, nonresidents $10.
c. Required by State Board of Health
d. Residents $5, nonresidents $10.
e. Residents $2, nonresidents $5
f. Residents $20, nonresidents $5.

In February, 1958, the two Councils acted to withdraw the current list of foreign medical schools.

TABLE 27.—*Citizenship Requirements for Permanent Licensure*

No Requirement

California
Canal Zone
District of Columbia
Guam
Indiana
Utah
Virgin Islands
Washington

Declaration of Intention

Arizona
Connecticut
Illinois
Iowa
Maryland
Massachusetts
Mississippi
New Mexico
New York
North Dakota
Oregon
Pennsylvania
Rhode Island
South Dakota
Texas
Virginia
Wisconsin

Full Citizenship

Alabama
Alaska
Arkansas
Colorado
Delaware
Florida
Georgia
Hawaii
Idaho
Kansas
Kentucky
Louisiana
Maine
Michigan
Minnesota
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
North Carolina
Ohio
Oklahoma
Puerto Rico
South Carolina
Tennessee
Vermont
West Virginia
Wyoming

The withdrawal of this list and its accompanying recommendation is to become effective as of Jan. 1, 1960. The Councils wish to emphasize that this notice of discontinuing the listing of foreign medical schools is not intended to indicate any lowering of standards of the foreign medical schools that

TABLE 28.—*Registration Policies for Citizens of Canada by Licensing Boards in the United States*

	Graduates of Approved Canadian Medical Schools Considered for Licensure by *Examination* on Same Basis as Graduates of Approved Medical Schools in United States	Graduates of Approved Canadian Medical Schools Presenting Canadian Registration Acceptable for Licensure by Reciprocity or Endorsement	Graduates of Medical Schools Outside of United States and Canada Presenting Canadian Registration Accepted for Licensure by Reciprocity or Endorsement on Such Credentials	United States Citizenship Requirement for Candidates from Canada		
				Full Citizenship	Declaration of Intention	Not Required
Alabama	x	..	..	..	..	x
Alaska	x	..	..	x	..	..
Arizona	x	..	..	..	x	..
Arkansas	x	..	..	x	..	..
California	x	..	..	..	..	x
Canal Zone	x	x	x	..	..	x
Colorado	x	..	..	x	..	..
Connecticut	x	..	..	..	x	..
Delaware	x	..	..	x	..	..
District of Columbia	x	..	..	..	..	x
Florida	x	..	..	x	..	..
Georgia	x	..	..	x	..	..
Guam	x	..	..	..	..	x
Hawaii	x	..	..	..	x	..
Idaho	x	..	..	x	..	..
Illinois	x	..	..	..	x	..
Indiana	x	..	..	..	..	x
Iowa	x	x	..	x	..	..
Kansas	x	..	..	x	..	..
Kentucky	x	..	..	x	..	..
Louisiana	x	..	..	..	x	..
Maine	x	..	..	..	..	x
Maryland	x	..	..	..	..	x
Massachusetts	x	..	..	..	x	..
Michigan	x	..	..	..	x[1]	..
Minnesota	x	..	..	..	..	x
Mississippi	x	x	..	..	..	x
Missouri	x	..	..	..	x[2]	x
Montana	x	..	..	..	x	..
Nebraska	x	..	..	x	..	..
Nevada	x	..	..	..	x	..
New Hampshire	x	x	x	..	..	x
New Jersey	x	..	..	x	..	..
New Mexico	x	..	..	..	x	..
New York	x	..	..	..	x	..
North Carolina	x	..	..	..	x[1]	..
North Dakota	x	..	..	..	x[1]	..
Ohio	x	..	..	..	x	..
Oklahoma	x	..	..	x	..	..
Oregon	x	..	..	..	x	..
Pennsylvania	x	..	..	..	x	..
Puerto Rico	x	..	..	x	..	..
Rhode Island	x	..	..	..	x	..
South Carolina	x	..	..	x	..	..
South Dakota	x	..	..	..	x	..
Tennessee	x	..	..	x	..	..
Texas	x	..	..	..	x	..
Utah	x	..	..	..	..	x
Vermont	x	x	..	..	..	x
Virgin Islands	x	.	..	..	..	x
Virginia	x	..	..	..	..	x[1]
Washington	x	x	..	..	..	x
West Virginia	x	..	..	x	..	..
Wisconsin	x	..	..	..	x	..
Wyoming	x	x	..	x	..	..

x Implies yes.
1. Issued temporary license renewable for five years or until full citizenship is obtained.
2. Internship completed in United States required.

TABLE 29.—*Status of Requirements for Medical Licensure for Physicians Trained in Foreign Countries Other than Canada**

	Written Examination Required	Admitted Also on Reciprocal or Endorsement Basis	Citizenship	Basic Science Certificate	Internship in United States	Recognition Limited to Graduates of Schools Accepted by A. M. A. and A. A. M. C.**	Required to Pass Examination of Educational Council for Foreign Medical Graduates	Additional Requirements	Examination Fee, Dollars
Alabama	x	..	x	x	x	..	x	x	10
Alaska	x	x	x	x	x	x	..	..	35
Arizona	x	..	D	x	x	..	x	..	25
Arkansas	Not Accepted								
California	x	..	..	..	x	..	..	x	25
Canal Zone	Not Accepted								
Colorado	x	..	x	x	x	x	..	x	25
Connecticut	x	..	D	x	..	x	x	x	35
Delaware	x	x	x	..	x	x	x	x	25
District of Columbia	x	x	..	x	x	x	..	..	25
Florida	x	..	x	x	..	..	x	..	50
Georgia	x	x	x	..	..	x	..	..	20
Guam	x	x	..	..	x	x	..	..	50
Hawaii	x	x	x	..	x	x	..	x	50
Idaho	Not Accepted								
Illinois	x	..	D	..	x	..	..	x	50
Indiana	x	..	..	..	..	..	..	x	25
Iowa	x	..	D	x	x	x	..	x	25
Kansas	x	x	x	x	x	..	..	x	50
Kentucky	x	..	x	..	x	..	..	x	50
Louisiana	Not Accepted								
Maine	x	..	x	..	x	..	x	..	27
Maryland	x	..	D	..	x	..	x	x	35
Massachusetts	x	..	D	..	..	..	..	x	25
Michigan	x	..	x	x	x	..	x	x	50
Minnesota	x	..	x	x	x	x	x	x	25
Mississippi	x	..	D	..	..	x	x	..	10
Missouri	x	..	x	..	x	..	x	..	25
Montana	x	x	x	..	x	..	..	..	50
Nebraska	x	..	x	x	..	..	x	..	25
Nevada	Not Accepted								
New Hampshire	x	x	x	..	x	..	x	x	30
New Jersey	x	x	x	..	x	..	..	x	50
New Mexico	x	..	D	x	..	x	x	..	50
New York	x	..	D	..	..	..	..	..	40
North Carolina	x	..	x	..	..	x	x	x	50
North Dakota	x	..	D	..	x	..	x	..	50
Ohio	x	..	x	..	..	..	x	x	25
Oklahoma	Not Accepted								
Oregon	x	..	D	x	x	..	x	x	50
Pennsylvania	x	..	D	..	x	..	x	x	25
Puerto Rico	Not Accepted								
Rhode Island	x	..	D	x	x	x	x	x	25
South Carolina	Not Accepted								
South Dakota	x	..	D	x	x	..	x	x	20
Tennessee	x	x	x	x	..	..	..	x	35
Texas	x	..	D	x	..	x	x	..	50
Utah	Not Accepted								
Vermont	x	..	x	..	x	..	x	x	20
Virgin Islands	x	..	..	..	x	x	..	x	65
Virginia	x	..	D	..	x	..	..	x	25
Washington	x	x	..	x	x	x	..	..	25
West Virginia	x	..	x	..	x	..	x	x	25
Wisconsin	x	x	D	x	x	..	..	x	75
Wyoming	Not Accepted								

This summary should be supplemented by direct communication with the secretary of the licensing board of the state in which the physician is interested.

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* See separate table applicable to Canadian citizens.

** The withdrawal of the listing of foreign medical schools by the American Medical Association and the Association of American Medical Colleges, and its accompanying recommendation is to become effective as of January 1, 1960.

x Implies yes.

D Declaration of intention to become citizen of the United States.

Additional Requirements

Alabama. Candidate is eligible if he is certified by the National Board of Medical Examiners and approved.

California. Two-year internship in an approved hospital in the United States, one of said years being in California.

Colorado. Credentials must be submitted in original form and accompanied by translation and will be directly verified or documents should bear evidence of being visaed by the U. S. Consul in the [illegible] ool of graduation is or was located. [illegible] of foreign medical schools not on accepted [illegible] by E. C. F. M. G. before serving as interns or residents. Minimum of three years of hospital training in approved hospital in United States or Canada required, one year of which must be in general medicine.

Delaware. Residence for one year required.

Georgia. Reciprocity applicants may furnish certification of passing examination of E. C. F. M. G. in lieu of acceptable medical school, and applicants for examination are given consideration on an individual basis.

Hawaii. Diplomates of National Board eligible on reciprocity basis.

Illinois. Limited license for practice in hospitals maintained by the state.

Indiana. Graduation from medical school approved by Indiana board, plus repetition of senior year in approved medical school in United States or two years' postgraduate work in approved hospital in the United States. Postgraduate work must be obtained in states other than Indiana.

Iowa. Requirements include (1) medical diploma, (2) three years of residency training approved by the board, and (3) recommendation of the Educational Council of Foreign Medical Graduates.

Kansas. Certificate from medical college specifying in detail the physical equipment of the school, the curriculum, current catalog showing courses of study, and certificate that the college is recognized by authorities of such foreign country as qualifying its graduates for practice therein; diploma from such college; certificate of licensure in the country where graduated; one year of internship in the United States or certificates from reputable practitioners or teachers licensed in United States who graduated from same school.

Kentucky. Applicant required to complete at least five years' training in the United States in an institution approved by the board and to have successfully passed examination of National Board of Medical Examiners.

Maryland. Graduates of recommended foreign medical schools may be admitted to examination after completion of one year of internship or residency in an approved hospital in the United States if their credentials are approved and have submitted at least two letters from the hospital authorities recommending them as to professional ability and moral character.

Graduates of foreign medical schools not on the recommended list who obtained the medical degree after Jan. 1, 1940, are not accepted unless they have served at least three years as an intern or resident in approved hospitals in the United States and have submitted at least two letters from each hospital recommending them as to their professional ability and moral character.

Graduates of foreign medical schools, before Jan. 1, 1940, whose schools were known to have had acceptable standards at the time of graduation may be considered if their credentials and professional experience in the United States are acceptable.

Ability to write and speak the English language clearly is a primary requisite.

Massachusetts. Must furnish documentary evidence that education is equivalent to that of graduates of United States medical schools and shall be required to take examination of National Board of Medical Examiners who shall certify that the applicant has successfully passed said examination.

Minnesota. Two-year internship is required.

New Hampshire. Diplomates of National Board of Medical Examiners eligible on endorsement basis. Temporary license valid until citizenship is completed may be given. Considered on an individual basis.

New Jersey. Internship completed in foreign countries after July 1, 1934, not acceptable. Acceptance limited to schools recognized by the board. Considered on an individual basis. After Jan. 1, 1955, must have minimum of three years' training in a hospital approved by the board.

North Carolina. At the discretion of the Board.

Ohio. Graduates of schools of Continental Europe after 1943 are eligible if on accepted list. If not licensed in a foreign country must have one year in hospital in the United States; if not on accepted list, two years of training in an approved hospital in the United States. Considered on an individual basis.

Oregon. The board at its discretion may utilize the facilities of the *Educational Council for Foreign Medical Graduates.* Must show evidence of internship and/or residency of not less than two years in not more than two hospitals approved for such training. Less than an unqualified recommendation from the heads of these training programs shall preclude further consideration.

Pennsylvania. Graduates of foreign medical schools, with the exception of those who matriculated before Oct. 1, 1957 in the schools approved by the board or those licensed by examination in another state, are required to pass the examinations of the Educational Council for Foreign Medical Graduates.

Rhode Island. E. C. F. M. G. certification required for those who begin to qualify after Jan. 1, 1958.

South Dakota. Applicant required to practice in an emergency area for four years under a temporary license and reappear before the board for permanent licensure. After July 1, 1955, only those cleared through IRO will be eligible.

Tennessee. All applicants must be from medical schools whose curriculum equals that of the University of Tennessee. Each applicant considered on an individual basis.

Vermont. Certification by Educational Council for Foreign Medical Graduates or National Board of Medical Examiners required.

Virgin Islands. Residence of six months required.

Virginia. Applicant must be licensed to practice medicine and surgery in country in which school of graduation is located or must have completed the course of study and passed examinations equivalent to those required for a diploma or license conferring such full right to practice. Two years of internship in approved hospital in the United States or Canada within the past five years prior to application or one year of study in an approved medical school in lieu of one year of the internship. If citizenship is not acquired within seven years after licensure, the license automatically becomes void.

West Virginia. Applicant must be resident of the state for three years preceding application and recommended by local society. Certification by Educational Council for Foreign Medical Graduates considered.

Wisconsin. 1953 Legislature established One Year Temporary Educational Permit, which authorizes graduates of unapproved foreign schools to obtain residency training in [illegible] renewed for two additional years. Educ [illegible] Medical Graduates certification accepted [illegible] cedure.

Marginal Number	SCHOOL	Alabama		Alaska		Arizona		California		Colorado		Connecticut		Delaware		District of Columbia		Florida		Georgia		Illinois		Indiana		Iowa		Kansas		Louisiana		Maine		Maryland	
	Marginal Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17	
		P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	
	ARGENTINA																																		
1	Universidad Nacional de Buenos Aires Facultad de Ciencias Medicas											1	0									3	3											3	
2	Universidad Nacional de Cordoba Facultad de Ciencias Medicas											0	1																					0	
3	Universidad Nacional del Litoral Facultad de Ciencias Medicas, Rosario																																		
4	Universidad Nacional de La Plata							1	0																										
	AUSTRALIA																																		
5	University of Adelaide Faculty of Medicine																																		
6	University of Melbourne Faculty of Medicine																																		
7	University of Sydney Medical School																																		
8	University of Queensland Medical School, Brisbane																																		
	AUSTRIA																																		
9	Karl-Franzens Universitat, Medizinische Fakultat, Graz											1	1									14	7											0	
10	Leopold Franzens Universitat, Medizinische Fakultat, Innsbruck							1	0			1	0									3	6									1	0		
11	Medizinische Fakultat der Universitat, Wien					1	0	1	2			3	0			3	0					1	2												
	BELGIUM																																		
12	Universite Libre de Bruxelles Faculte de Medecine											1	0									1	0									1	0	1	
13	Universiteit Gent Faculteit der Geneeskunde also Universite de Gand Faculte de Medecine											2	0																						
14	Universite de Liege Faculte de Medecine											1	0																			1	0		
15	Universite Catholique de Louvain Faculte de Medecine											3	1			1	0					1	2											1	
	BOLIVIA																																		
16	Universidad de San Simon Facultad de Medicina, Cochabamba							0	1																										
	BRAZIL																																		
17	Faculdade de Medicine Cirurgia e Pharmacia, Bahia																																		
18	Universidade do Brazil Faculdade de Medicine, Cirurgia e Pharmacia, Rio de Janeiro											0	1																						
19	Universidade de Sao Paulo Faculdade de Medicine, Sao Paulo																																		
20	Universidade de Parana Faculdade de Medicine, Curitiba																																	0	1
	BULGARIA																																		
21	University of Sofia Faculty of Medicine																					1	0												
	CHILE																																		
22	Universidad de Chile, Facultad de Ciencias Medicas, Santiago											0	1									1	0												
	CHINA																																		
23	University of Hongkong Faculty of Medicine																																	1	0
24	China Union Medical College, Peiping																															1	0		
25	Pennsylvania Medical School, Medical Department of St. John's University, Shanghai							1	0			1	1									0	1											1	0
26	Cheeloo University School of Medicine, Foochow																																		
27	Hackett Medical College for Women, Canton																																		
28	Woman's Christian Medical College, Shanghai																																		
29	National College of Medicine of Shanghai																																		
30	West China Union University School of Medicine, Chengtu, Szechwan							3	0													0	2												
31	Army Medical College, Peking, Chihli							1	0																										
32	Chinese Medical College, Canton																																		
33	Dr. Sun Yat-Sen Medical College Lingnan University, Canton							0	1			1	1																			0	1	3	0
34	Aurora University French School of Medicine, Shanghai							0	1																										
35	Military Medical College, Nanking							0	1																										
36	National Central University College of Medicine, Nanking							1	0																							0	1		
37	Tung Nan Medical College, Shanghai																																		
38	National Kiangsu Medical College, Chengkiang, Kiangsu							0	1																										
39	National Kweiyang Medical College, Kweiyang, Kweichow							1	0																										
40	Fukien Provincial Medical College, Foochow, Fukien							1	0																									1	0
41	Kwong Hua Medical College, Canton, Kwangtung																																		
42	Hopeh Provincial Medical College, Paoting																																		
43	Hsiang Ya Medical College, Changsha																																		
	COLOMBIA																																		
44	Universidad-Nacional Facultad de Medicina, Bogota							1	2													0	1											1	0
45	Universidad de Cartagena Facultad de Medicina, Cartagena																																	1	0
46	Universidad de Antioquia Facultad de Medicina y Ciencias Naturales, Medellin																																		
47	Universidad Catolica Facultad de Medicina de la Pontificia, Bogota													1	0							1	0												
	CUBA																																		
48	Universidad de la Habana Facultad de Medicina y Farmacia							2	2			1	0					5	8	5	0	25	33											2	5
	CZECHOSLOVAKIA																																		
49	Duetsche Universitat Medizinische Fakultat, Prag											1	0									1	3											1	0
50	Universita Karlova Fakulta Lekarska, Praha											0	2									0	2												
51	Masarykova Universita Fakulta Lekarska, Brno																					1	2												
	DENMARK																																		
52	Kobenhavns Universitet Laegevidenskabelige Fakultet											0	1																						2
	DOMINICAN REPUBLIC																																		
53	Universidad de Santo Domingo Facultad de Medicina							1	1			1	0									2	19												
	ECUADOR																																		
54	Universidad Central Facultad de Ciencias Medicas, Quito							1	0													1	5											1	0
55	Universidad de Guayaquil Facultad de Medicina, Guayaquil							1	1																										
	EGYPT																																		
56	Egyptian University Faculty of Medicine, Cairo																																		
57	Fouad First University Faculty of Medicine, Cairo							1	0																										
58	Alexandria University Faculty of Medicine, Alexandria											0	1									1	0												
	Marginal Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17	

20 Minnesota		21 Mississippi		22 Missouri		23 Nebraska		24 Nevada		25 New Hampshire		26 New Jersey		27 New Mexico		28 New York		29 North Carolina		30 North Dakota		31 Ohio		32 Oregon		33 Pennsylvania		34 Rhode Island		35 South Dakota		36 Texas		37 Virginia		38 Washington		39 West Virginia		40 Wisconsin		41 Wyoming		42 Hawaii and Puerto Rico		43 Totals	44 Examined—Passed	45 Examined—Failed	46 % Failed	47 Number of Boards Examined By	Marginal Number
P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F						
																																				0	1											12	7	5	41 7	4	1
																																																2	0	2	100.0	2	2
																																0	1													2	0	2	100.0	2	3
																																															1	1	0	0.0	1	4
																						1	0									0	1													2	1	1	50.0	2	5
												2	0			1	1																													4	3	1	25.0	2	6
																2	0																													3	2	1	33.3	2	7
																																														1	0	1	100.0	1	8
												3	3			0	3					3	4			1	0	1	0																	42	23	19	45.2	8	9
								1	0			2	2			1	1					2	4					1	0					1	0											32	18	14	43.8	12	10
												0	1			6	12			0	1	1	4											0	1			1	0							40	17	23	57.5	11	11
																																		1	0											5	5	0	0.0	5	12
																																														2	2	0	0 0	1	13
																																		1	0											3	3	0	0.0	1	14
																2	0					1	0													0	1									13	9	4	30.8	7	15
												1	0																																	2	1	1	50.0	2	16
																																0	1													2	0	2	100 0	2	17
																1	1																													3	1	2	66 7	2	18
1	0																																													1	1	0	0 0	1	19
																																														1	0	1	100.0	1	20
																						0	2																							3	1	2	66.7	2	21
																																								1	0					3	2	1	33.3	3	22
																																														1	1	0	0.0	1	23
																																								1	0					3	2	1	33.3	3	24
												1	0			3	0									2	0							1	1											13	10	3	23 1	8	25
																																		1	0											2	2	0	0 0	2	26
																						0	1																							1	0	1	100.0	1	27
												1	0			1	1																													4	3	1	25.0	3	28
												1	0			1	0															1	0	0	1											5	4	1	20.0	5	29
																																		0	1											11	3	4	57.1	4	30
																																														1	1	0	0.0	1	31
																																														1	1	0	0.0	1	32
												1	0															1	0					0	1											10	6	4	40.0	7	33
																1	1																													3	1	2	66.7	2	34
																																														1	0	1	100.0	1	35
																																														3	1	2	66.7	2	36
																																														1	0	1	100.0	1	37
																																				0	1									2	0	2	100.0	2	38
																																														1	1	0	0.0	1	39
																																														1	1	0	0.0	1	40
																																														1	1	0	0.0	1	41
																						0	1																							1	0	1	100.0	1	42
																1	0																													1	1	0	0.0	1	43
1	0															0	1					0	1																							8	3	5	62.5	6	44
																																		0	1											2	1	1	50.0	2	45
																																														1	1	0	0.0	1	46
																																														1	1	0	0.0	1	47
												2	0			9	1					2	5									2	1	2	6			1	0					1	1	125	61	64	51.2	14	48
																3	7																													16	6	10	62.5	4	49
												2	1			1	5					0	1																							15	4	11	73.3	6	50
																1	0																													4	2	2	50.0	2	51
																2	0																	1	1	0	1							1	0	9	6	3	33.3	6	52
																0	1											1	0					2	0									14	2	44	21	23	52.3	7	53
												1	0									0	2																							11	4	7	63.6	5	54
																																														2	1	1	50.0	2	55
																																								1	0					1	1	0	0.0	1	56
																																														1	1	0	0.0	1	57
																																		1	0											3	2	1	33.3	3	58
20		21		22		23		24		25		26		27		28		29		30		31		32		33		34		35		36		37		38		39		40		41		42		43	44	45	46	47	

Marginal Number		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
	SCHOOL	Alabama		Alaska		Arizona		California		Colorado		Connecticut		Delaware		District of Columbia		Florida		Georgia		Illinois		Indiana		Iowa		Kansas		Louisiana		Maine		Maryland			
		P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F
	EL SALVADOR																																				
59	Universidad de El Salvador Facultad de Medicina, San Salvador																					0	1														
	ENGLAND																																				
60	University of Birmingham Faculty of Medicine															1	0																	1	0		
61	University of Bristol Faculty of Medicine							2	0			0	1																			1	0				
62	University of Cambridge Faculty of Medicine							1	0															1	0					1	0						
63	University of Durham Medical School, Kings College, Newcastle-upon-Tyne							1	0			0	1																								
64	University of Leeds School of Medicine							1	0															1	0												
65	University of Liverpool Medical School	1	0					1	0																									1	0		
66	University of London Faculty of Medicine, London							3	0			2	1	1	0									1	0	1	0									1	
67	University of Manchester Faculty of Medicine							1	0																												
68	College of Physicians of London, Member of the Royal College of Surgeons, England											1	0									1	0														
	ESTONIA																																				
69	Tartu Ulikooli-Faculte de Medecine de l'Universite de Tartu																					0	1														
	FRANCE																																				
70	Universite de Lyon Faculte de Medecine et de Pharmacie																					0	1														
71	Universite de Montpellier Faculte de Medecine																																	0	1		
72	Universite de Nancy Faculte de "																															1	0				
73	Universite de Paris Faculte de "	1	0																			2	3											4	1		
74	Universite de Toulouse Faculte "																					1	0														
75	Universite de Strasbourg Faculte de Medecine							1	0			0	1									0	1														
	GERMANY																																				
76	Friedrich-Wilhelms Universitat Medizinische Fakultat, Berlin							0	1			0	1									1	3													0	1
77	Rheinische Friedrich-Wilhelms Universitat Medizinische Fakultat,							0	1			1	1									2	3											1	0		
78	Fr							1	0			3	1	0	1							3	4									1	0	0	2	1	0
79	Al			1	0	1	0					2	0									1	1											1	0		
80	H																																				
81	Ge							1	1													3	1													0	1
82	Er																					1	1														
83	U							3	1			2	0									1	4											3	1	0	1
84	Th																					0	1														
85	Cl							0	1			1	0									1	2									0	1				
86	Albertus Universitat Medizinische Fakultat, Konigsberg																																				
87	Universitat Leipzig Medizinische Fakultat																					0	1														
88	Philipps Universitat Medizinische Fakultat, Marburg											1	0									3	1									1	0	1	0		
89	Ludwig-Maximilians Universitat Medizinische Fakultat, Munchen							5	0			2	0									4	12									3	2	7	1		
90	Eberhard-Karls Universitat Medizinische Fakultat, Tubingen											0	1									3	4											2	0		
91	Julius-Maximilians Universitat Medizinische Fakultat, Wurzburg							1	0													0	2											2	0	0	1
92	Hamburgische Universitat Medizinische Fakultat, Hamburg							3	1			1	0					1	0			0	3											1	0		
93								1	0													1	1											1	0	0	1
94	e Fakultat,											1	0									3	2											2	1		
95	tat, Munster																					0	1														
96	Medizinische Akademie							2	0			1	0									2	0														
97																																					
98								1	0			1	0									1	0														
99	Berlin																					1	0														
100	Medizinische Fakultat, Breslau																					0	1														
101	Universitat Rostock, Medizinische Fakultat, Rostock																																				
	GREECE																																				
102	National University of Athens School of Medicine							4	2			2	4									10	20									3	0	5	5	0	3
103	Aristotle University of Salonica Faculty of Medicine, Salonika							1	0			1	1																					0	2		
	HAITI																																				
104	Ecole Nationale de Medecine et de Pharmacie, Port-au-Prince																					1	3														
	HUNGARY																																				
105	Magyar Kiralyi Pazmany Petrus Tudomanyegyetem Orvosi Fakultasa, Budapest					1	0	0	4			2	0			1	0					6	7											0	1	1	0
106	Magyar Kiralyi Ferencz Josef Tudomanyegyetem Orvostudomanyi Kara, Szeged							0	1													1	1														
107	Magyar Kiralyi Erzsebet Tudomanyegyetem Orvostudomanyi, Pecs							1	2													0	1														
108	Magyar Kiralyi Tisza-Istvan Tudomanyegyetem Orvosi Fakultasa, Debrecen																																				
	INDIA																																				
109	University of Bombay							1	0																									2	0	0	1
110	University of Calcutta											1	0									0	1	1	0												
111	University of Madras Medical College											1	0																					1	0		
112	University of Uthal Medical College, Cutack											0	1																								
113	Medical College of Agra																																				
	IRAN																																				
114	Madresseh Teb, Teheran											1	2									2	2											6	2	0	2
	IRAQ																																				
115	Royal Iraq Medical College, Bagdad							0	1																									2	0	1	0
	IRELAND																																				
116	Queen's University Faculty of Medicine, Belfast											2	0					1	0															1	1	1	[illegible]
117	National University of Ireland							5	2			20	7	0	1			1	0			1	1											1	0	0	1
118	University of Dublin School of Physic, Trinity College, Dublin											3	0									2	1														
119	Schools of Surgery, Royal College of Surgeons in Ireland, Dublin																																				
Marginal Number		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	

Minnesota	Mississippi	Missouri	Nebraska	Nevada	New Hampshire	New Jersey	New Mexico	New York	North Carolina	North Dakota	Ohio	Oregon	Pennsylvania	Rhode Island	South Dakota	Texas	Virginia	Washington	West Virginia	Wisconsin	Wyoming	Hawaii and Puerto Rico	Totals	Examined—Passed	Examined—Failed	% Failed	Number of Boards Examined By	Marginal Number
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	
P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F	P F						
																1 0							2	1	1	50.0	2	59
								1 0									1 1						5	4	1	20.0	4	60
																							4	3	1	25.0	3	61
						1 0		3 0										1 0					8	8	0	0.0	6	62
								1 1															4	2	2	50.0	3	63
								1 0									1 1						5	4	1	20.0	4	64
								2 1					2 0			1 0							9	8	1	11.1	6	65
								15 1	0 1				1 0				1 0			1 0			30	27	3	10.0	11	66
								2 0									0 1						4	3	1	25.0	3	67
								1 2								1 0	2 1	2 0					11	8	3	27.3	6	68
								3 4															8	3	5	62.5	2	69
																							1	0	1	100.0	1	70
						1 0																5 0	7	6	1	14.3	3	71
											0 1												2	1	1	50.0	2	72
						2 0		8 8		1 0	2 0		1 0			0 1	1 0					1 1	38	24	14	36.8	12	73
																							1	1	0	0.0	1	74
								1 0															4	2	2	50.0	4	75
								3 6			1 0						0 1	1 0					20	7	13	65.0	9	76
											1 0				1 0		2 0						13	8	5	38.5	7	77
1 0						4 0		4 3			2 4						2 0						38	23	15	39.5	13	78
											1 0						1 0						9	8	1	11.1	7	79
																					1 0		1	1	0	0.0	1	80
1 0		0 1				1 1					0 1						0 2						15	7	8	53.3	9	81
																							2	1	1	50.0	1	82
1 0	1 0					2 0		4 5			7 2		1 0	1 0			4 2						46	30	16	34.8	13	83
											0 1												2	0	2	100.0	2	84
																	1 0			1 0			9	5	4	44.4	7	85
											0 1			1 0									2	1	1	50.0	2	86
								1 1															3	1	2	66.7	2	87
						1 0		1 0								1 0	1 1						12	10	2	16.7	8	88
2 0						8 1		2 4			4 7			2 0			3 3						75	45	30	40.0	12	89
						1 0					1 2						2 0						19	12	7	36.8	7	90
1 0											0 1			1 0		1 0	1 1	1 0					14	9	5	35.7	11	91
						1 0		2 1			5 2			2 0		2 0							25	18	7	28.0	10	92
								1 0			0 1												7	4	3	42.9	6	93
						1 0		1 2	0 1		1 1						3 3					1 0	23	13	10	43.5	8	94
								1 0			1 1						1 0						5	3	2	40.0	1	95
						1 0		0 1								1 0	1 1						10	8	2	20.0	7	96
																	1 0		1 0	1 0			3	3	0	0.0	3	97
																	1 1						5	4	1	20.0	4	98
																	1 0						2	2	0	0.0	2	99
																							1	0	1	100.0	1	100
								0 1															1	0	1	100.0	1	101
						1 1		9 5			0 2		1 0	2 0			3 6			1 0			89	41	48	53.9	13	102
						1 0											2 0						9	6	3	33.3	6	103
						1 0											1 0						6	3	3	50.0	3	104
1 0						1 0		7 13			0 5			2 0			1 1						55	24	31	56.7	14	105
						2 0		1 1			1 1		1 0			2 0							12	8	4	33.3	7	106
								1 3			0 1												9	2	7	77.8	4	107
								0 3															3	0	3	100.0	1	108
																	0 1						5	3	2	40.0	4	109
																	1 0						4	3	1	25.0	4	110
																							1	1	0	0.0	1	111
																							2	1	1	50.0	2	112
																	0 1						1	0	1	100.0	1	113
1 0						0 1		6 5			0 1			2 0		1 1	1 2						38	20	18	47.4	11	114
						1 0																	5	4	1	20.0	4	115
1 0								4 0	0 1								3 2						14	11	3	21.4	6	116
1 0						1 0		3 0			1 0					1 0	1 0						51	37	14	27.5	13	117
																							8	6	2	25.0	4	118
																	1 0						1	1	0	0.0	1	119
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	

	Marginal Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17	
Marginal Number	SCHOOL	Alabama		Alaska		Arizona		California		Colorado		Connecticut		Delaware		District of Columbia		Florida		Georgia		Illinois		Indiana		Iowa		Kansas		Louisiana		Maine		Maryland	
		P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F
	IRELAND—Continued																																		
120	Licentiate of the Royal College of Physicians of Ireland, Licentiate of the Royal College of Surgeons in Ireland																																		
121	Licentiate of the Apothecaries' Hall, Dublin																																		
	ISRAEL																																		
122	Hadassah Medical School, Hebrew University, Jerusalem																					1	0											1	0
	ITALY																																		
123	Universita degli Studi di Bologna, Facolta di Medicina e Chirurgia							2	1			1	1									3	3									2	1	1	0
124	Universita degli Studi di Milano, Facolta di Medicina e Chirurgia							0	1			2	0			1	0					1	1												
125	Universita degli Studi di Catania, Facolta di Medicina e Chirurgia							0	1																							1	1	1	0
126	Universita degli Studi di Firenze, Facolta di Medicina e Chirurgia																					0	1											2	0
127	Universita degli Studi di Genova, Facolta di Medicina e Chirurgia							1	0			1	0									0	1											1	0
128	Universita degli Studi di Messina, Facolta di Medicina e Chirurgia																																	2	1
129	Universita degla Studi di Modena, Facolta di Medicina e Chirurgia							0	1			0	1																						
130	Universita di Napoli, Facolta di Medicina e Chirurgia							1	0			0	2									1	2									1	1	1	3
131	Universita degli Studi di Padova, Facolta di Medicina e Chirurgia							2	0													0	1											1	0
132	Universita degli Studi di Palermo, Facolta di Medicina e Chirurgia							0	1			1	0									0	1									1	0	1	0
133	Universita degli Studi di Parma, Facolta di Medicina e Chirurgia																					1	2												
134	Universita degli Studi di Pavia, Facolta di Medicina e Chirurgia																					0	1												
135	Universita degli Studi di Perugia, Facolta di Medicina e Chirurgia																																	1	0
136	Universita degli Studi di Roma, Facolta di Medicina e Chirurgia							5	2			7	2					1	1			3	6											4	4
137	Universita degli Studi di Siena, Facolta di Medicina e Chirurgia																					0	1												
138	Universita di Torino, Facolta di Medicina e Chirurgia							1	0																										
139	Universita degli Studi "Benito Mussolini" di Bari, Facolta di Medicina e Chirurgia							0	1													0	1												
140	Universita di Pisa Facolta di Medicina e Chirurgia																																		
	JAPAN																																		
141	Tokyo Imperial University Faculty of Medicine							0	1																										
142	Nagoya Medical College																																	2	0
143	Chiba University of Medicine							1	0																										
144	Okayama Medical College											0	1																					1	0
145	Tohoku Imperial University Medical Faculty, Sendai							1	0																										
146	Kyoto Medical College													1	0																				
147	Tokyo Charity Association Medical College																																		
148	Tokyo Women's Special Medical School																																		
149	Keio Gijuku University Medical College, Tokyo							1	0																									1	0
150	Teikoku Women's Medical-Pharmacological College, Toho University, Tokyo							1	0																										
151	Faculty of Medicine, Nihon University, Tokyo																																		
152	Faculty of Medicine, Hokkaido University, Sapporo, Hokkaido											0	1																						
153	Kobe Medical College, Ikuta-ku, Kobe, Hyogo											1	0																						
154	Yamaguchi Prefectural University of Medicine																																		
	KOREA																																		
155	Severance Union Medical College, Keijo, Seoul																																	0	1
156	Seoul National University College of Medicine, Seoul																																	2	0
157	Seoul Women's Medical College, Keijo, Seoul							1	0																									0	1
	LATVIA																																		
158	Latvijas Universitate Medicinas Fakultate, Riga																					0	2											0	2
	LEBANON																																		
159	American University of Beirut School of Medicine							1	0			1	1			1	0					4	1											2	0
160	Faculte Francaise de Medecine de l'Universite de St. Joseph, Beyrouth											3	1			1	0															1	0		
	LITHUANIA																																		
161	Vytauto Didziojo Universteto Medicinos Fakulteto, Kaunas																					2	7									0	1	1	1
	MANCHURIA																																		
162	Mukden Medical College, Mukden																																		
	MEXICO																																		
163	Universidad Nacional Autonoma de Mexico Facultad de Medicina, Mexico, D. F.							2	5			1	1									6	19					1	0					0	2
164	Escuela de Medicina de Nuevo Leon, Monterrey																					2	5												
165	Universidad de Guadalajara Facultad de Ciencias Medicas y Biologicas							1	0																										
166	Universidad Nacional del Sureste Facultad de Medicina, Merida, Yucatan																					1	0												
167	Escuela Nacional de Medicina Homeopatico del Instituto Politecnico Nacional, Mexico, D. F.																					0	1												
168	Universidad Automoma Facultad de Medicina, Guadalajara							0	2																										
	NETHERLANDS																																		
169	Universiteit van Amsterdam Geneeskunde Faculteit							1	0			3	1					1	0					2	0									0	1
170	Rijks-Universiteit te Groningen Medische Faculteit									1	0																					1	0	0	1
171	Rijks-Universiteit te Leiden Faculteit der Geneeskunde							3	0			3	0									1	2	0	1										
172	Rijks-Universiteit te Utrecht Faculteit der Geneeskunde																					1	0												
	NEW ZEALAND																																		
173	University of New Zealand, Dunedin																																		
	NICARAGUA																																		
174	Universidad de Nicaragua Facultades de Medicina en Leon y en Granada							0	3													0	1											0	1
	NORWAY																																		
175	Kongelige Frederiks Universitet Medisinske Fakultet, Oslo																																		
	PERU																																		
176	Universidad Mayor de San Marcos de Lima Facultad de Medicina							1	0													2	0											1	2
	PHILIPPINES																																		
177	University of Santo Tomas Faculty of Medicine and Surgery, Manila							3	1													2	1											1	2
	Marginal Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17	

20 Minnesota		21 Mississippi		22 Missouri		23 Nebraska		24 Nevada		25 New Hampshire		26 New Jersey		27 New Mexico		28 New York		29 North Carolina		30 North Dakota		31 Ohio		32 Oregon		33 Pennsylvania		34 Rhode Island		35 South Dakota		36 Texas		37 Virginia		38 Washington		39 West Virginia		40 Wisconsin		41 Wyoming		42 Hawaii and Puerto Rico		43 Totals	44 Examined—Passed	45 Examined—Failed	46 % Failed	47 Number of Boards Examined By	Marginal Number
P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F						
																												1	0					0	2											3	1	2	66.7	2	120
																						2	0																							2	2	0	0.0	1	121
																																														2	2	0	0.0	2	122
				0	1							2	1			22	13					2	1			1	0	7	1					1	0									1	0	70	46	24	34.3	14	123
																2	2																	1	0											13	9	4	30.8	7	124
												0	1			0	3																													8	2	6	75.0	5	125
																0	1																	1	0											6	3	3	50.0	5	126
																2	2					0	2																							11	6	5	45.5	7	127
																																														3	2	1	33.3	1	128
																1	1																	1	2											7	2	5	71.4	4	129
												5	3			6	5									1	0	1	0																	41	24	17	41.5	10	130
												2	1			8	7																	0	1											25	14	11	44.0	7	131
												0	1			4	6											1	0					1	0											18	9	9	50.0	9	132
												1	0																																	4	2	2	50.0	2	133
												1	0			3	1																													6	4	2	33.3	3	134
																1	0																													2	2	0	0.0	2	135
				1	0							12	1			33	21	0	1			1	3			2	0	1	0					2	0											116	72	44	37.9	13	136
																0	1																													2	0	2	100.0	2	137
												1	0			3	4					1	1					1	0																	12	7	5	41.7	5	138
																1	1					1	1					1	0																	7	3	4	57.1	5	139
																0	1																													1	0	1	100.0	1	140
																																														1	0	1	100.0	1	141
																																		1	1											4	3	1	25.0	2	142
																																														1	1	0	0.0	1	143
																																												1	0	3	2	1	33.3	3	144
																																												1	0	2	2	0	0.0	2	145
																																														1	1	0	0.0	1	146
																																												1	0	1	1	0	0.0	1	147
																																												0	1	1	0	1	100.0	1	148
																																		1	0									1	0	4	4	0	0.0	4	149
																												1	0					0	1									0	1	4	2	2	50.0	4	150
																																												0	1	1	0	1	100.0	1	151
																																		1	1											3	1	2	66.7	2	152
																																														1	1	0	0.0	1	153
																																		0	1											1	0	1	100.0	1	154
1	0																											1	0					0	1											4	2	2	50.0	4	155
																																														2	2	0	0.0	1	156
																																		1	0											3	2	1	33.3	3	157
												0	1			3	5					1	3			1	0	1	0																	20	7	13	65.0	8	158
1	0															3	3					2	0			1	0					1	0	2	3											31	23	8	25.8	12	159
																1	1					1	0											1	1											14	8	6	42.9	7	160
												2	0			1	7					0	4																							26	6	20	76.9	6	161
																1	0																													1	1	0	0.0	1	162
		2	0	0	1					1	0	1	0			0	1					5	2					1	0			8	1	3	5									8	6	82	39	43	52.4	15	163
																																7	2	0	1											17	9	8	47.0	3	164
																						1	0																					0	1	3	2	1	33.3	3	165
																																														1	1	0	0.0	1	166
																																		2	2											5	2	3	60.0	2	167
																																														2	0	2	100.0	1	168
												1	0			4	0	1	0							1	0							1	2	2	2			1	0			1	0	25	19	6	24.0	13	169
																1	0																													2	2	0	0.0	2	170
												5	0	1	0	11	0					1	0											4	1	2	1									40	33	7	17.5	14	171
												3	0	1	0	1	0																	1	0											8	8	0	0.0	6	172
																								1	0																					1	1	0	0.0	1	173
																																														5	0	5	100.0	3	174
																										1	0																			1	1	0	0.0	1	175
												1	0			1	0					1	0					1	0					0	1			1	0							13	10	3	23.0	10	176
																4	6									1	0							1	5	1	0			1	0			4	1	34	18	16	47.0	9	177
20		21		22		23		24		25		26		27		28		29		30		31		32		33		34		35		36		37		38		39		40		41		42		43	44	45	46	47	

TABLE 30.—*Foreign Trained Physicians Exam*

Marginal Number	SCHOOL	1 Alabama		2 Alaska		3 Arizona		4 California		5 Colorado		6 Connecticut		7 Delaware		8 District of Columbia		9 Florida		10 Georgia		11 Illinois		12 Indiana		13 Iowa		14 Kansas		15 Louisiana		16 Maine		17 Maryland	
		P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F	P	F
	PHILIPPINES—Continued																																		
178	University of the Philippines College of Medicine, Manila							1	2													2	3											2	0
179	Manila Central University College of Medicine, Manila							1	1			1	2									0	3											2	2
	POLAND																																		
180	Uniwersytet Jagiellonski Wydzial Lekarski, Cracow																					0	1											1	0
181	Uniwersytet Jana Kazimierza Wydzial Lekarski, Lwow																					0	1											1	2
182	Uniwersytet Jozefa Pilsudskiego, Warszawa											1	0									0	1												
183	Uniwersytet Poznanski Wydzial Lekarski, Poznan																					0	1											0	1
184	Uniwersytet Stefano Batorego Wydzial Lekarski, Wilno																																		
	PORTUGAL																																		
185	Universidade de Coimbra Faculdade de Medicina											0	1									0	1												
186	Universidade de Lisboa Faculdade de Medicina											1	0																						
187	Universidade de Porto Faculdade de Medicina							0	2																										
	RUMANIA																																		
188	Universitatea din Bucuresti Facultatea de Medicina																																		
189	Universitatea din Iasi Facultatea de Medicina																																		
190	Universitatea Regele Ferdinand I-iu din Cluj Facultatea de Medicina si Farmacie																					0	1												
	SCOTLAND																																		
191	University of Aberdeen Faculty of Medicine																							1	0										
192	University of St. Andrews Conjoint Medical School, St. Andrews and Dundee											2	0																						
193	University of Edinburgh Faculty of Medicine																																		
194	*University of Glasgow Medical Faculty*															1	0																		
195	Licentiate of the Royal Colleges of Physicians and Surgeons of Edinburgh, Licentiate of the Royal Faculty of Physicians and Surgeons of Glasgow															1	0	0	1															1	0
196	Polish School of Medicine, Edinburgh											0	1																						
	SOUTH AFRICA																																		
197	University of the Witwatersrand Medical School, Johannesburg																																		
198	University of Pretoria Faculty of Medicine, Pretoria															1	0					1	0												
199	University of Cape Town Faculty of Medicine, Cape Town																																		
	SPAIN																																		
200	Universidad de Barcelona Facultad de Medicina																																		
201	Universidad de Sevilla Facultad de Medicina																					1	0											0	1
202	Universidad de Granada Facultad de Medicina																					0	1												
203	Universidad Central de Espana Facultad de Medicina, Madrid							0	4			1	0					1	0			1	2									1	0	1	0
204	Universidad de Santiago Facultad de Medicina																																		
205	Universidad de Zaragoza Facultad de Medicina																					0	1											2	0
206	Universidad de Valencia Facultad de Medicina											1	1									1	0											1	1
207	Universidad Literaria de Valladolid Facultad de Medicina							0	1													1	0												
208	Universidad de Salamanca Facultad de Medicina																					1	0											1	0
	SWEDEN																																		
209	Karolinska Mediko-Kirurgiska Institutet, Stockholm																					1	1												
	SWITZERLAND																																		
210	Universitat Basel Medizinische Fakultat											2	0			1	0			1	0	1	1									3	0	1	0
211	Universitat Bern Medizinische Fakultat							2	0													0	1			1	0					1	0		
212	Universite de Geneva Faculte de Medecine							5	0			10	2			1	0	2	3	1	0													1	0
213	Universite de Lausanne Faculte de Medecine							1	2			8	1							1	0	2	2											2	2
214	Universitat Zurich Medizinische Fakultat							0	1			8	1					1	1			0	1											1	0
	TAIWAN																																		
215	Taihoku Special Medical School, Taihoku																																	1	0
	TURKEY																																		
216	University of Istanbul Medical Faculty											0	3			1	0					1	4	1	0									5	4
217	Ankara University Faculty of Medicine, Ankara																					0	1												
	UNION OF SOCIALIST SOVIET REPUBLICS																																		
218	First Leningrad Medical Institute, Leningrad																																		
219	Kazan Medical Institute, Kazan																																		
220	Kharkov Medical Institute, Kharkov																					0	2											0	1
221	Kiev Medical Institute, Kiev																					0	1												
222	Odessa Medical Institute, Odessa							0	1																										
223	Severo-Kavka Medical Institute, Rostov-on-the-Don																																		
224	Krim Medical Institute, Simferopol																					0	1												
225	Tbilisi Institute of Medicine, Tbilisi																					0	1												
226	Stalino Institute of Medicine, Stalino																					0	1												
227	Samarkand Institute of Medicine, Samarkand																																		
228	Ashkhabad Institute of Medicine, Ashkhabad																																		
229	Daghestan Medical Institute, Makhach, Kala																																		
230	Byelorussian Medical Institute, Bazarnaya ul., Minsk																																		
231	First Moscow Medical Institute, Moscow																																		
	WALES																																		
232	Welsh National School of Medicine, Cardiff											1	0																						
	YUGOSLAVIA																																		
233	Zagrebaskog Universiteta Medecinski Fakultet, Zagreb																					0	3											0	2
234	Beogradskog Universiteta Medecinski Fakultet, Beograd																					1	2												
235	Medicinska Visoka Sola, Ljubljana, Yugoslavia																																		
	Totals Examined—Passed	2		1		3		98		1		136		3		15		14		8		160		8		2		1		1		26		114	
	Totals Examined—Failed	0		0		0		65		0		58		2		0		14		0		278		1		0		0		0		9		66	
	Totals	2		1		3		163		1		194		5		15		28		8		438		9		2		1		1		35		180	
	Percentage Failed	0.0		0.0		0.0		39.9		0.0		29.9		40.0		0.0		50.0		0.0		63.5		11.1		0.0		0.0		0.0		25.7		36.7	
	Marginal Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17	

20 Minnesota P F	21 Mississippi P F	22 Missouri P F	23 Nebraska P F	24 Nevada P F	25 New Hampshire P F	26 New Jersey P F	27 New Mexico P F	28 New York P F	29 North Carolina P F	30 North Dakota P F	31 Ohio P F	32 Oregon P F	33 Pennsylvania P F	34 Rhode Island P F	35 South Dakota P F	36 Texas P F	37 Virginia P F	38 Washington P F	39 West Virginia P F	40 Wisconsin P F	41 Wyoming P F	42 Hawaii and Puerto Rico P F	43 Totals	44 Examined—Passed	45 Examined—Failed	46 % Failed	47 Number of Boards Examined By	Marginal Number
																						2 0	13	8	5	38.5	5	178
																	0 1						13	4	9	69.2	5	179
								0 5								1 0							8	2	6	75.0	4	180
						1 0		3 2			0 2												13	6	7	53.8	6	181
								0 6			1 1												10	2	8	80.0	4	182
								2 1			1 1		1 0										8	4	4	50.0	5	183
								0 1			0 1		1 0										3	1	2	66.7	3	184
																	1 0						3	1	2	66.7	3	185
											1 0			1 0									3	3	0	0.0	3	186
																							2	0	2	100.0	1	187
								3 3									1 1						9	4	5	55.6	3	188
								1 1															2	1	1	50.0	1	189
								0 1															2	0	2	100.0	2	190
								2 0									1 0	1 0					5	5	0	0.0	4	191
								4 2															8	6	2	25.0	2	192
								3 1															5	3	2	40.0	2	193
								2 0						1 0		1 0	2 1						9	7	2	22.2	6	194
								0 1															4	2	2	50.0	4	195
								1 0						1 0			0 1						4	2	2	50.0	4	196
								1 0															2	2	0	0.0	2	197
																							3	3	0	0.0	3	198
								0 1															1	0	1	100.0	1	199
																1 1	1 0					3 0	6	5	1	16.7	3	200
																							2	1	1	50.0	2	201
																						1 0	2	1	1	50.0	2	202
											1 1						1 2					17 3	36	24	12	33.3	9	203
																						2 1	3	2	1	33.3	1	204
																							3	2	1	33.3	2	205
						1 0		0 1			1 0						0 1						9	5	4	44.4	7	206
																							2	1	1	50.0	2	207
																						4 0	6	6	0	0.0	3	208
						1 0														1 0			4	3	1	25.0	3	209
	1 0					1 0		2 0									0 1						15	13	2	13.3	10	210
						1 0		17 5			2 0					1 0							31	25	6	19.4	8	211
		1 0				7 0		36 10			3 0		3 0	1 0			3 3			1 1		1 0	98	79	19	19.4	17	212
	1 0					3 0		20 6					3 0	2 0			0 1						57	43	14	24.6	11	213
			1 0			5 0		6 1			1 1		3 0	1 0				1 0		1 0			39	30	9	23.1	14	214
																							1	1	0	0.0	1	215
								5 3			1 0						2 4			1 0			37	18	19	51.4	11	216
																	1 1						3	1	2	66.7	2	217
						1 0																	1	1	0	0.0	1	218
								0 1															1	0	1	100.0	1	219
											0 4												7	0	7	100.0	3	220
						1 2		1 0			1 1												7	3	4	57.1	4	221
								1 0															2	1	1	50.0	2	222
											0 1												2	1	1	50.0	2	223
																							1	0	1	100.0	1	224
											0 2												3	0	3	100.0	2	225
																							1	0	1	100.0	1	226
													1 0										1	1	0	0.0	1	227
						1 0																	1	1	0	0.0	1	228
											0 1												1	0	1	100.0	1	229
						0 2																	2	0	2	100.0	1	230
								0 1															1	0	1	100.0	1	231
																							1	1	0	0.0	1	232
						1 0		0 2					1 0							1 0			11	4	7	63.6	7	233
								0 3			1 2												9	2	7	77.8	3	234
		2 3				1 0																	1	1	0	0.0	1	235
14	5	2	1	1	1	111	2	352	1	1	71	1	35	42	1	35	95	12	4	14	1	71	1,518					
0	0	3	0	0	0	24	0	262	4	1	95	0	0	1	0	10	94	6	0	1	0	19	1,049					
14	5	5*	1	1	1	135	2	614	5	2	166	1	35	43	1	45	189	18	4	15	1	90	2,567					
0.0	0.0	60.0	0.0	0.0	0.0	17.8	0.0	42.7	80.0	50.0	57.2	0.0	0.0	2.3	0.0	22.2	49.7	33.3	0.0	6.7	0.0	21.1	40.9					
20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	

have been on the list. Rather, this action reflects the Councils' inability to acquire and maintain a continuing, adequate knowledge of the educational programs of the foreign medical schools whose graduates come to the United States.

The two Councils now recommend that agencies in the United States concerned with the medical qualifications of graduates of foreign medical schools consider certification by the Educational Council for Foreign Medical Graduates as evidence that the recipient of such certification is possessed of medical knowledge comparable to that expected of graduates of approved medical schools in the United States and Canada. These two Councils further recommend that such certification be considered as evidence of the quality of medical training offered by the medical school attended by the holder of a certificate at the time of his graduation.

The present requirements for foreign-trained physicians seeking medical licensure in the United States and its territories and possessions are given in table 29. This chart was developed in an effort to assist the foreign-trained physician seeking licen-

TABLE 31.—*Physicians Examined on the Basis of Credentials Obtained in Countries Other Than the United States and Canada, 1930-1958*

Year	Number Examined	Passed	Percentage Failed
1930	167	92	44.9
1931	158	91	42.4
1932	182	96	47.3
1933	200	129	35.5
1934	285	170	40.2
1935	437	303	30.7
1936	588	382	35.0
1937	920	637	30.8
1938	1,164	716	38.5
1939	1,691	839	50.4
1940	2,088	948	54.7
1941	1,717	698	59.2
1942	1,630	890	45.4
1943	1,031	518	49.8
1944	691	325	53.0
1945	475	209	56.0
1946	495	221	55.3
1947	601	283	52.9
1948	639	311	51.3
1949	737	319	56.7
1950	799	359	55.0
1951	1,006	524	47.9
1952	1,208	648	46.3
1953	1,463	796	46.3
1954	1,642	943	42.6
1955	1,771	1,042	41.4
1956	1,783	1,012	43.2
1957	2,299	1,345	41.5
1958	2,567	1,518	40.9
Totals	30,434	16,364	46.2

TABLE 32.—*Foreign-Trained Physicians Licensed By State Boards, 1946-1958*

	Examination							Reciprocity and Endorsement							Grand Total
	1946-1953	1954	1955	1956	1957	1958	Total	1946-1953	1954	1955	1956	1957	1958	Total	
Alabama	4	2	1	1	1	2	11	3	0	0	0	1	0	4	15
Alaska	..	..	..	..	..	1	1	..	..	..	..	..	0	0	1
Arizona	3	0	2	2	6	3	16	4	1	4	1	0	0	10	26
Arkansas	1	0	0	0	0	0	1	1	0	1	0	0	0	2	3
California	384	83	135	129	90	98	919	49	1	0	0	0	0	50	969
Colorado	40	1	3	0	4	1	49	0	0	0	0	0	0	0	49
Connecticut	68	13	13	25	87	136	342	77	19	23	16	19	5	159	501
Delaware	4	1	1	3	4	3	16	5	3	0	0	1	2	11	27
District of Columbia	27	6	2	2	8	15	60	58	14	10	12	16	26	136	196
Florida	60	13	27	14	28	14	156	0	0	0	0	0	0	0	156
Georgia	19	6	2	5	5	8	45	7	3	3	6	2	1	22	67
Idaho	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
Illinois	595	216	157	79	128	160	1,335	0	3	0	0	0	0	3	1,338
Indiana	3	20	2	3	6	8	42	7	16	4	9	21	17	74	116
Iowa	17	5	4	12	7	2	47	30	2	1	1	3	1	38	85
Kansas	5	1	3	5	2	1	17	0	0	0	0	0	0	0	17
Kentucky	1	0	0	0	0	0	1	2	1	0	1	0	0	4	5
Louisiana	1	3	1	0	0	1	6	0	0	0	0	0	0	0	6
Maine	28	16	44	25	24	26	163	12	7	6	4	5	8	42	205
Maryland	134	44	55	71	126	114	544	6	1	0	1	1	0	9	553
Massachusetts	58	7	11	16	24	21	137	9	4	2	4	0	0	19	156
Michigan	31	25	40	23	30	31	180	11	7	17	14	23	14	86	266
Minnesota	50	17	17	16	17	14	131	0	0	0	0	1	0	1	132
Mississippi	7	1	2	0	2	5	17	2	0	0	0	0	0	2	19
Missouri	39	4	14	11	9	2	79	5	1	0	2	0	0	8	87
Montana	1	0	0	0	0	0	1	2	1	0	0	0	0	3	4
Nebraska	3	0	0	1	1	1	6	7	1	0	0	1	3	12	18
Nevada	0	0	0	0	0	1	1	0	1	0	0	0	0	1	2
New Hampshire	8	4	3	6	5	1	27	20	6	3	5	7	7	48	75
New Jersey	41	19	23	41	86	111	321	195	24	22	42	23	37	343	664
New Mexico	2	3	4	0	3	2	14	16	1	1	2	0	0	20	34
New York	1,257	184	159	193	268	352	2,413	247	8	7	5	1	3	271	2,684
North Carolina	22	8	0	0	1	1	32	5	1	2	1	1	1	11	43
North Dakota	25	0	5	7	2	1	40	0	0	0	0	0	0	0	40
Ohio	191	117	160	117	86	71	742	188	48	47	27	19	71	400	1,142
Oklahoma	2	0	0	0	0	0	2	3	1	1	0	0	1	6	8
Oregon	1	0	0	0	0	1	2	0	0	0	0	0	0	0	2
Pennsylvania	42	12	6	10	15	35	120	0	0	0	0	0	0	0	120
Rhode Island	69	34	35	39	36	42	255	2	1	1	2	4	11	21	276
South Carolina	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1
South Dakota	18	2	4	1	13	1	39	1	0	0	1	3	0	5	44
Tennessee	6	1	0	2	0	0	9	3	0	0	3	0	5	11	20
Texas	50	14	16	17	34	35	166	28	0	3	4	1	3	39	205
Utah	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vermont	1	0	0	0	0	0	1	3	2	3	2	2	2	14	15
Virginia	39	23	54	84	91	95	386	16	0	0	0	0	0	16	402
Washington	21	5	5	7	9	12	59	13	4	6	5	7	17	52	111
West Virginia	9	1	0	8	7	4	29	0	0	0	0	0	0	0	29
Wisconsin	6	3	2	2	7	14	34	4	3	1	8	13	10	39	73
Wyoming	0	0	0	0	0	1	1	2	0	0	0	0	0	2	3
U. S. Possessions and Territories	63	29	30	35	72	71	300	24	3	0	2	5	5	39	339
Totals	3,457	943	1,042	1,012	1,345	1,518	9,317	1,067	188	163	180	180	250	2,033	11,350

sure in the United States. While an attempt has been made to present the situation as it exists, the table is intended to give only a summary of existing requirements. Persons interested in licensure should supplement these data by communicating with the licensing boards. Medical licensure in the United States is a "state right" and is entirely under the jurisdiction of the governments of the individual states. The power to license physicians is exercised through the medical licensing board of each state, territory or possession. There is also available from the office of either Council a pamphlet entitled "The Present and Future Status of Foreign Medical School Credentials in the United States" which contains helpful information to foreign-trained physicians.

Table 30 records the number of graduates of foreign faculties of medicine examined for medical licensure by 43 boards in 1958. The figures include both American and foreign-born physicians educated abroad. Graduates of the medical schools in the Philippines, New Zealand, 13 South and Central American countries, 26 countries in Europe, and 15 countries in Asia were represented at examinations. The number totaled 2,567. Graduates of 231 medical schools and four licensing corporations were examined. The number who were successful was 1,518; failures numbered 1,049, or 40.9%. More than 75 graduates each from the University of Cuba, Munich, Athens, Rome, Mexico, and Geneva were tested in 1958, and more than 20 graduates from 33 other schools were examined. The following eight states examined the greatest number of foreign-trained physicians.

	Examined	Passed	Failed, No.	Failed, %
New York	614	352	262	42.7
Illinois	438	160	278	63.5
Connecticut	194	136	58	29.9
Virginia	189	95	94	49.7
Maryland	180	114	66	36.7
Ohio	166	71	95	57.2
California	165	98	65	39.9
New Jersey	135	111	24	17.8

Table 31 presents the number of graduates of foreign faculties of medicine examined for medical licensure in the United States in 29 years (1930-1958). In 1936 the number of foreign-trained physicians seeking licensure in the United States began to increase, and by 1940 over three times as many were tested as in 1936. Beginning in 1944, the number examined began to decrease until 1951, when there was a noticeable increase. In each succeeding year the number of examined has increased. In 1958, the increase over the previous year was 268. At no time in the 29-year period did fewer than 30% fail in a given year.

In table 32 figures are given for 13 years showing the number of foreign-trained physicians licensed by each state board, both after written examination and by endorsement of credentials. Aggregate figures are given for the years 1946-1953, inclusive,

TABLE 33.—*Graduates of Foreign Medical Faculties Representing Additions to the Medical Profession, 1958*

	Examination	Reciprocity and Endorsement	Total
Alabama	0	0	0
Alaska	1	0	1
Arizona	2	0	2
Arkansas	0	0	62
California	62	0	62
Canal Zone	0	0	0
Colorado	2	0	2
Connecticut	89	0	89
Delaware	3	0	3
District of Columbia	5	12	17
Florida	6	0	6
Georgia	2	4	6
Guam	0	2	2
Hawaii	6	0	6
Idaho	0	0	0
Illinois	147	0	147
Indiana	8	9	17
Iowa	6	0	6
Kansas	1	0	1
Kentucky	0	0	0
Louisiana	0	0	0
Maine	18	0	18
Maryland	114	0	114
Massachusetts	7	0	7
Michigan	18	1	19
Minnesota	10	4	14
Mississippi	4	0	4
Missouri	0	0	0
Montana	0	0	0
Nebraska	0	0	0
Nevada	1	0	1
New Hampshire	0	2	2
New Jersey	75	0	75
New Mexico	2	0	2
New York	249	0	249
North Carolina	0	0	0
North Dakota	0	0	0
Ohio	67	0	67
Oklahoma	0	0	0
Oregon	1	0	1
Pennsylvania	20	0	20
Puerto Rico	56	0	56
Rhode Island	35	2	37
South Carolina	0	0	0
South Dakota	4	0	4
Tennessee	0	0	0
Texas	19	0	19
Utah	0	0	0
Vermont	0	0	0
Virgin Islands	1	1	2
Virginia	63	0	63
Washington	12	0	12
West Virginia	3	0	3
Wisconsin	10	0	10
Wyoming	0	0	0
Totals	1,129	37	1,166

TABLE 34.—*Additions to the Medical Profession Representing Graduates of Foreign Medical Faculties 1950-1958*

Year	Examination	Reciprocity and Endorsement	Totals
1950	267	41	308
1951	425	25	450
1952	545	24	569
1953	662	23	685
1954	749	23	772
1955	881	26	907
1956	834	18	852
1957	991	23	1,014
1958	1,129	37	1,166
Totals	6,483	240	6,723

and for each individual year from 1954 to 1958. While table 31 reflects the candidates registered after examination only and indicates the percentage failing in each year, table 32 records the total licensed in each state. In the period shown there were 9,317 licenses issued to foreign-trained physicians after written examination and 2,033 by endorsement of credentials. The total number of licentiates in both groups registered was 11,350.

Represented in table 33 are figures regarding the foreign-trained physicians registered in 1958 who were not previously licensed in the United States and who, therefore, are additions to the medical profession. There were 1,166 in this group, of whom 1,129 were licensed by written examination and 37 by endorsement of credentials. Comparative figures for eight previous years together with the figures for 1958 are given in table 34. In eight years (1950-

CORRESPONDING OFFICERS OF BOARDS OF MEDICAL EXAMINERS IN THE UNITED STATES, TERRITORIES, AND OUTLYING POSSESSIONS

Alabama	Dr. D. G. Gill, Secretary, State Office Building, Montgomery 4.
Alaska	Dr. W. M. Whitehead, Secretary, 172 S. Franklin St., Juneau.
Arizona	Mr. Robert Carpenter, Executive Secretary, 826 Security Bldg., Phoenix.
Arkansas	Dr. Joe Verser, Secretary, Harrisburg.
California	Dr. Louis E. Jones, Secretary, Room 536, 1020 N St., Sacramento.
Canal Zone	Dr. Eric R. Osterberg, Health Director, Balboa Heights.
Colorado	Dr. John B. Farley, Secretary, 715 Republic Bldg., 1612 Tremont Place, Denver 2.
Connecticut	Dr. Stanley B. Weld, Secretary, 160 St. Ronan St., New Haven.
Delaware	Dr. Joseph S. McDaniel, Secretary, Professional Bldg., Dover.
District of Columbia	Mr. Paul Foley, Deputy Director, 1740 Massachusetts Ave., N.W., Washington.
Florida	Dr. Homer L. Pearson, Secretary, 901 N.W. 17th St., Miami 36
Georgia	Mr. Cecil L. Clifton, Secretary, 224 State Capitol, Atlanta 3.
Guam	Dr. John E. Kennedy, Secretary, Marianas Islands, Agana.
Hawaii	Dr. I. L. Tilden, Secretary, 1020 Kapiolani St., Honolulu.
Idaho	Mr. Armand L. Bird, Executive Secretary, 364 Sonna Bldg., Boise.
Illinois	Mr. Fredric B. Selcke, Superintendent of Registration, Capitol Bldg., Springfield.
Indiana	Miss Ruth V. Kirk, Executive Secretary, 538 K. of P. Bldg., Indianapolis.
Iowa	Mr. Ronald V. Saf, Executive Secretary, State Office Building, Des Moines 19.
Kansas	Dr. F. J. Nash, Secretary, New Brotherhood Bldg., Kansas City.
Kentucky	Dr. Russell E. Teague, Secretary, 620 South Third St., Louisville 2.
Louisiana	Dr. Edwin H. Lawson, Secretary, 930 Hibernia Bank Bldg., New Orleans 12.
Maine	Dr. Stephen A. Cobb, Secretary, Sanford.
Maryland	Dr. Frank K. Morris, Secretary-Treasurer, 1211 Cathedral St., Baltimore 1.
Massachusetts	Dr. David W. Wallwork, Secretary, State House, Room 37, Boston 33.
Michigan	Dr. E. C. Swanson, Executive Secretary, 118 Stevens T. Mason Bldg., West Michigan Ave., Lansing 8.
Minnesota	Dr. F. H. Magney, Secretary, 230 Lowry Medical Arts Bldg., St. Paul 2.
Mississippi	Dr. R. N. Whitfield, Assistant Secretary, Old Capitol, Jackson 13.
Missouri	Mr. John A. Hailey, Executive Secretary, State Capitol Building, P. O. Box 4, Jefferson City.
Montana	Dr. Thomas L. Hawkins, Secretary, 555 Fuller Ave., Helena.
Nebraska	Mr. R. K. Kirkman, Director, Room 1009, State Capitol Build., Lincoln 9.
Nevada	Dr. George H. Ross, Secretary, 112 North Curry St., Carson City.
New Hampshire	Dr. Edward W. Colby, Secretary, 61 South State St., Concord.
New Jersey	Dr. Royal A. Schaaf, Secretary, 28 West State St., Trenton.
New Mexico	Dr. R. C. Derbyshire, Secretary, 227 East Palace Ave., Santa Fe.
New York	Dr. Stiles D. Ezell, Secretary, 23 South Pearl St., Albany 7.
North Carolina	Dr. Joseph J. Combs, Secretary, 716 Professional Bldg., Raleigh.
North Dakota	Dr. C. J. Glaspel, Secretary, Box 228, Grafton.
Ohio	Dr. H. M. Platter, Secretary, 21 West Broad St., Columbus 15.
Oklahoma	Dr. E. F. Lester, Secretary, 813 Braniff Bldg., Oklahoma City.
Oregon	Mr. Howard I. Bobbitt, Executive Secretary, 609 Failing Bldg., Portland 4.
Pennsylvania	Mrs. Margaret G. Steiner, Secretary, Box 911, Harrisburg.
Puerto Rico	Mr. Joaquin Mercado Cruz, Secretary, Box 9156, Santurce.
Rhode Island	Mr. Thomas B. Casey, Administrator, 366 State Office Bldg., Providence.
South Carolina	Dr. Harold E. Jervey Jr., Secretary, 1329 Blanding St., Columbia.
South Dakota	Mr. John C. Foster, Executive Secretary, 300 First National Bank Bldg., Sioux Falls.
Tennessee	Dr. H. W. Qualls, Secretary, 1635 Exchange Bldg., Memphis 3.
Texas	Dr. M. H. Crabb, Secretary, 1714 Medical Arts Bldg., Fort Worth 2.
Utah	Mr. Frank E. Lees, Director, 324 State Capitol Building, Salt Lake City 1.
Vermont	Dr. F. J. Lawliss, Secretary, Richford.
Virgin Islands	Dr. Rudolph U. Lanclos, Secretary, Charlotte Amalie.
Virginia	Dr. K. D. Graves, Secretary, 631 First St., S.W., Roanoke.
Washington	Mr. Thomas A. Carter, Administrator, Capitol Building, Olympia.
West Virginia	Dr. Newman H. Dyer, Secretary, State Office Building, No. 3, Charleston 5.
Wisconsin	Dr. Thomas W. Tormey Jr., Secretary, 1140 State Office Bldg., 1 West Wilson St., Madison.
Wyoming	Dr. Franklin D. Yoder, Secretary, State Office Building, Cheyenne.

1958) there were 6,483 foreign-trained physicians who were added to the physician population of the United States, 6,483 obtaining licensure by written examination, and 240 by endorsement of credentials.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Basic science laws currently exist in 21 states and the District of Columbia. The enactment of a basic science law provides for the establishment of a state board of examiners in the basic sciences underlying the practice of the healing art, to provide for its organization and powers, to provide that certificates by that board be a prerequisite to eligibility for examination for licenses to practice the healing art, and to define the healing art. Basic science boards have no licensing powers. The healing art, as defined in the statutes, includes any system, treatment, operation, diagnosis, prescription, or practice for the ascertainment, cure relief, palliation, adjustment, or correction of any human disease, ailment, deformity, injury, or unhealthy or abnormal physical or mental condition.

Table 35 lists the states where basic science laws exist and the year of enactment. Minnesota, Nebraska, and Washington, in 1927, were the first states to effect such legislation; Kansas under a "Healing Arts Act", in 1957, was the last state to require such certification.

The specific basic sciences designated in the legislation vary with the different laws. All boards examine in anatomy, pathology, and physiology, and the majority include bacteriology and chemistry. Ten include Hygiene, two diagnosis, and one requires public health. Table 36 lists the basic science boards and the subjects in which examinations are required.

Table 35.—*States Having Basic Science Laws and Year of Enactment*

Alaska	1946	Nebraska	1927
Arizona	1936	Nevada	1951
Arkansas	1929	New Mexico	1941
Colorado	1937	Oklahoma	1937
Connecticut	1925	Oregon	1934
District of Columbia	1929	Rhode Island	1940
Florida	1939	South Dakota	1939
Iowa	1935	Tennessee	1943
Kansas	1957	Texas	1949
Michigan	1937	Washington	1927
Minnesota	1927	Wisconsin	1925

The laws in some states provide for certification without examination by exemption, waiver, reciprocity, or endorsement. The credentials acceptable for certification by one of these methods are outlined in table 37.

The results of examinations given and the number of certificates issued on the basis of waiver, exemption, reciprocity, or endorsement, as reported by the basic science boards during 1958, are shown in tables 38 and 39. The laws generally do not specify that a candidate reveal his school of practice but were developed for the purpose of insuring, insofar as possible, that all individuals who enter into the area of the healing arts have what is considered to be an adequate preparatory background. Table 38 records the total number of candidates reported by the several boards as having been examined and the number who passed and failed. No attempt has been made to differentiate the schools of the healing arts represented by the candidates examined or certified. Twelve boards either had no failures or did not report figures for failures. The percentage of candidates failing is given for those states that did submit these data.

Table 36.—*Subjects Included in Basic Science Examinations*

	Anatomy	Bacteriology	Chemistry	Diagnosis	Hygiene	Pathology	Physiology	Public Health
Alaska	x	x	x	..	x	x	x	..
Arizona	x	x	x	..	x	x	x	..
Arkansas	x	x	x	..	x	x	x	..
Colorado	x	x	x	..	..	x	x	..
Connecticut	x	..	..	x	x	x	x	..
District of Columbia	x	x	x	..	..	x	x	..
Florida	x	x	x	..	..	x	x	..
Iowa	x	x	x	..	x	x	x	..
Kansas	x	x	x	..	..	x	x	..
Michigan	x	x	x	..	..	x	x	..
Minnesota	x	x	x	..	x	x	x	..
Nebraska	x	x	x	..	x	x	x	..
Nevada	x	x	x	..	..	x	x	..
New Mexico	x	x	x	..	..	x	x	..
Oklahoma	x	x	x	..	..	x	x	..
Oregon	x	x	x	..	x	x	x	..
Rhode Island	x	x	x	..	..	x	x	..
South Dakota	x	x	x	..	..	x	x	..
Tennessee	x	x	x	..	..	x	x	..
Texas	x	x	x	..	x	x	x	x
Washington	x	x	x	..	x	x	x	..
Wisconsin	x	..	..	x	..	x	x	..

The 22 boards in operation in 1958 examined 4,600 candidates and granted certificates of proficiency in the basic sciences by written examination to 3,592 individuals. In addition, as noted in table 39, there were 2,677 certificates issues by reciprocity, endorsement, exemption, or waiver by 21 boards. The number of applicants registered with or without examination in 1958 was 6,269. Of these, Texas issued 741, Florida 666, Michigan 571, and Wisconsin 508. Other states ranged from Alaska with 22 to Arkansas with 456.

In the 32 years since the enactment of the first such laws (table 40) 95,069 certificates in the basic sciences have been issued, 66,282 by examination and 29,787 by reciprocity, endorsement, exemption, or waiver. The percentage of failures in this period was 20.5.

The fees for certification in the basic sciences in the states requiring such certification are given in table 41. Examination and endorsement meetings are held in most instances semiannually, although some boards meet quarterly. THE JOURNAL publishes semimonthly the future dates of examination and reciprocity or endorsement meetings of all basic science boards.

In 1958 there were 4,600 examinations given by basic science boards; 3,592 were successful and 1,008 were unsuccessful, thereby failing to give evidence of basic preparation adequate to qualify for further consideration for licensure. Figures on how many individuals these 1,008 failures represent were not available for this report. The boards are not uniform with respect to repetition of examinations

TABLE 37.—*Reciprocity, Endorsement, Waiver, or Exemption Policies of Basic Science Boards*

Alaska

Physicians are accepted on reciprocity from those states with which the board of medical examiners has established reciprocal agreements.

Arizona

A reciprocal certificate issued on the basis of a basic science certificate that has been obtained by an examination before the issuing board and provided that at least four subjects were passed at one sitting unless the state in question examines in fewer than four of the six subjects required by the Arizona law. Reciprocity will be extended to those applicants who were licensed to practice in a state prior to the passage of the basic science law of that state.

Arkansas

Reciprocity on the basis of written examination taken before all states having basic science laws except Florida, Iowa, and Tennessee. The credential of the National Board of Medical Examiners is acceptable for reciprocal registration. State medical board examinations in the basic science subjects are acceptable when they are deemed to be equivalent to the Arkansas basic science examination.

Colorado

Reciprocity as to examination with the following basic science boards: Alaska, Arizona, Arkansas, District of Columbia, Kansas, Michigan, Minnesota, Nebraska, Nevada, New Mexico, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, Texas, and Washington.

Reciprocity as to examination with the Iowa Basic Science Board is granted to those candidates having made original application to that board on or before June 1, 1949. Candidates making application after that date and holding a certificate must meet the minimum requirements, i.e., that the candidate pass an examination in the basic sciences under a basic science board and that he pass, at one sitting, at least four of the five subjects given by the basic science board of Colorado, with subsequent passing of the fifth subject.

With Connecticut and Wisconsin there is reciprocity as to examination in the subjects of anatomy, physiology, and pathology. Candidates from these states are required to pass the examinations in chemistry and bacteriology.

Connecticut

No reciprocity with other basic science boards. Certification by endorsement obtainable by diplomates of the National Board of Medical Examiners or to candidates holding a license obtained by examination in another state. The latter is acceptable only after three years' professional activity.

District of Columbia

Reciprocity has not been established with the basic science boards. The basic science board may exempt an applicant. All applications are considered on an individual basis. Basic science examination as part of a medical license used for reciprocal licensure would be acceptable if licensure was granted.

Florida

No reciprocity, waiver, or exemption policies.

Iowa

All applications considered on an individual basis. May accept examination results of other boards if, in the opinion of the Iowa board, the examination is considered equal to that of the Iowa board.

Kansas

No formal reciprocal agreements. Board will consider on an individual basis acceptance of examinations given by other basic science board, state medical boards, and part 1 of the examination of the National Board of Medical Examiners.

Michigan

Certificates issued by examination are accepted for registration by waiver from the basic science boards of Alaska, Arizona, Arkansas, Colorado, District of Columbia, Iowa, Kansas, Minnesota, Nebraska, Nevada, New Mexico, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, Texas and Wisconsin.

Applicants who present certificates from the Wisconsin Basic Science Board are examined in bacteriology and chemistry.

The Michigan Board may accept, in lieu of its own examination, the basic science portion of the examination given by any legally constituted examining or licensing board in the healing arts it such examination is equal or equivalent to the examinations given by the Michigan Board.

Minnesota

Reciprocity on an automatic basis with the basic science boards of Colorado, Nebraska, Oregon and Tennessee (after Feb. 9, 1950), and on the basis of having passed part 1 of the examination of the National Board of Medical Examiners.

Reciprocity on an individual basis with the basic science boards of Alaska, Arizona, Connecticut, Michigan (grades must be 75% or more in each subject), Nevada, New Mexico, Oklahoma, South Dakota, and Texas.

Reciprocity on an individual basis with the medical licensing boards of California, Indiana, Kansas, Kentucky, New York *(subsequent to 1925—any before 1925 required to take examinations* in bacteriology and pathology), Oklahoma, Texas, Vermont, Virginia, Washington (grades must be 75% or more in each subject), and West Virginia.

Partial credit granted for grades in certain subjects passed in examinations of medical licensing boards of Alabama, Georgia, Louisiana, Maryland, North Carolina, Washington, and Wisconsin.

Nebraska

The board will permit waiver of [illegible] are considered individually. States [illegible] are those granting exemptions from [illegible] from Nebraska where the conditions of the laws and regulations have been met, even though these conditions differ somewhat from those of Nebraska. Waiver applied to both basic science boards and medical boards.

Nevada

Reciprocity on the basis of written examination with the basic science boards of Arizona, Colorado, Iowa, Minnesota, New Mexico, Oklahoma, Oregon, South Dakota, Tennessee, Texas, and Washington. Waiver with basic science boards of Arkansas, Florida, Michigan and Nebraska. Applicants holding a Wisconsin Basic Science certificate must be examined in bacteriology and chemistry.

New Mexico

By reciprocity with Arizona, Arkansas, Colorado, Iowa, Michigan, Minnesota, Nevada, Oklahoma, Oregon, Rhode Island, South Dakota, Tennessee, Washington, and Wisconsin. Certificates granted by waiver to doctors who have been in continuous practice for thirty consecutive years or more and who have taken and passed examinations in the basic sciences.

Oklahoma

Applicants are reviewed on an individual basis. If qualified, will be accepted provided other state extends a like privilege to those holding basic science certificate of Oklahoma Board. A basic science certificate is not a prerequisite for licensure by reciprocity but is a requirement for licensure by examination.

Oregon

Reciprocity with the basic science boards of Arizona, Arkansas, Colorado, Iowa, Michigan, Minnesota, Nebraska, Nevada, New Mexico, Oklahoma, South Dakota, Tennessee, Texas, Washington, and Wisconsin.

Rhode Island

Endorsement after oral examination with Massachusetts Board of Registration in Medicine and basic science boards of Colorado, District of Columbia, and Oklahoma.

South Dakota

Reciprocity with the basic science boards of Alaska, Arizona, Arkansas, Colorado, Iowa, Kansas, Michigan, Minnesota, Nebraska, Nevada, New Mexico, Oklahoma, Oregon, Rhode Island (on an individual basis), Tennessee, Texas, Washington, and Wisconsin.

Tennessee

Reciprocity with all basic science boards except Arkansas, Connecticut, Florida, Iowa, New Mexico, Rhode Island, and Wisconsin.

Texas

Reciprocity with the basic science boards of Alaska, Arizona, Arkansas, Colorado, Iowa, Michigan, Minnesota, Nebraska, Nevada, Oklahoma, Oregon, South Dakota, Tennessee, and Washington. Applicants from Wisconsin required to pass examination of Texas board in bacteriology, chemistry, and public health and hygiene.

Washington

Reciprocity with all basic science boards.

Wisconsin

Waiver to commissioned officers of the armed forces or the Public Health Service to an applicant who has passed part 1 of the examination of the National Board of Medical Examiners, to a physician licensed to practice medicine in a state not having a basic science law or licensed in a state before the establishment of a basic science board provided he has served an internship or has practiced for at least one year since the license was granted, to a physician licensed in Canada, and to foreign trained physicians holding an M.D. degree from an acceptable school who are licensed to practice medicine in the country in which the school attended is located. Reciprocity is also granted on the basis of written examination with all states having basic science boards.

that have been failed and the accumulation of credit. The variance which exists in the evaluation methods of the states makes it impossible to analyze the figures on a comparable basis from state to state.

Although it is recognized that the data presented may be useful to those seeking licensure in these states, it is advisable to supplement the information by direct communication with the basic science board. The present executive corresponding officer of each of the 22 basic science boards is as follows:

Alaska..........Dr. R. Harrison Leer, Room 204, Alaska Office Bldg., Juneau.
Arizona..........Mr. Herman E. Bateman, University of Arizona, Tucson.
Arkansas..........Mr. S. C. Dellinger, Zoology Department, University of Arkansas, Fayetteville.
Colorado..........Dr. Esther B. Starks, 1459 Ogden St., Denver 18.
Connecticut..........Mrs. Regina G. Brown, 258 Bradley St., New Haven 10.
District of Columbia...Mr. Paul Foley, 1740 Massachusetts Ave., N. W., Washington 6.
Florida..........Mr. M. W. Emmel, Box 340, Gainesville.
Iowa..........Mr. Elmer W. Hertel, Wartburg College, Waverly.
Kansas..........Dr. L. C. Heckert, Pittsburg State Teachers College, Lansing.
Michigan..........Mrs. Anne Baker, 116 Stevens T. Mason Bldg., W. Michigan Ave., Lansing 15.
Minnesota..........Dr. Raymond N. Bieter, 165 Millard Hall, University of Minnesota, Minneapolis.
Nebraska..........Mr. R. K. Kirkman, Room 1009, State Capitol Bldg., Lincoln 9.
Nevada..........Dr. Donald G. Cooney, Box 9005, University Station, Reno.
New Mexico..........Mrs. Marguerite Cantrell, Box 1522, Santa Fe.
Oklahoma..........Mrs. Lucille Haidek, 813 Braniff Bldg., Oklahoma City.
Oregon..........Dr. Earl M. Pallett, State Board of Higher Education, Box 5175, Eugene.
Rhode Island..........Mr. Thomas B. Casey, 366 State Office Bldg., Providence.
South Dakota..........Dr. Gregg M. Evans, 310 E. 15th St., Yankton.
Tennessee..........Dr. O. W. Hyman, 62 S. Dunlap St., Memphis.
Texas..........Bro. Raphael Wilson, 407 Perry-Brooks Bldg., Austin.
Washington..........Mr. Thomas A. Carter, Department of Licenses, Capitol Bldg., Olympia.
Wisconsin..........Mr. William H. Barber, 621 Ransom St., Ripon.

NATIONAL BOARD OF MEDICAL EXAMINERS

The National Board of Medical Examiners is a voluntary and unofficial examining agency, the purpose of which is to prepare and to administer qualifying examinations of such high quality that legal agencies governing the practice of medicine within each state may at their discretion grant successful candidates a license without further examination.

It is the function of the individual states to determine who shall practice within their borders and to maintain high standards of medical practice in

TABLE 38.—*Applicants Examined in Basic Sciences, 1958*

	Examined	Passed	Failed	% Failed
Alaska	1	1	*	..
Arizona	57	57	*	..
Arkansas	806	416	390	48.4
Colorado	155	155	*	..
Connecticut	219	219	*	..
District of Columbia	30	21	9	30.0
Florida	666	666	*	..
Iowa	196	196	*	..
Kansas	115	115	*	..
Michigan	453	234	219	48.3
Minnesota	249	249	*	..
Nebraska	50	42	8	16.0
Nevada	101	69	32	31.7
New Mexico	85	85	*	..
Oklahoma	83	64	19	22.9
Oregon	101	101	*	..
Rhode Island	127	109	18	14.2
South Dakota	55	55	*	..
Tennessee	157	149	8	5.1
Texas	239	239	*	..
Washington	117	89	28	23.9
Wisconsin	538	261	277	51.5
Total	4,600	3,592	1,008	21.9

* Failure data not reported.

TABLE 39.—*Basic Science Certificates Issued by Examination, Reciprocity, Endorsement, Exemption, or Waiver, 1958*

	Certified by		
	Examination	Reciprocity, Endorsement, Exemption, or Waiver	Total Certified
Alaska	1	21	22
Arizona	57	112	169
Arkansas	416	40	456
Colorado	155	122	277
Connecticut	219	121	340
District of Columbia	21	187	208
Florida	666	0	666
Iowa	196	110	306
Kansas	115	99	214
Michigan	234	337	571
Minnesota	249	167	416
Nebraska	42	29	71
Nevada	69	30	99
New Mexico	85	54	139
Oklahoma	64	1	65
Oregon	101	76	177
Rhode Island	109	2	111
South Dakota	55	26	81
Tennessee	149	110	259
Texas	239	502	741
Washington	89	284	373
Wisconsin	261	247	508
Total	3,592	2,677	6,269

accordance with their own rules and regulations. In recognition of the thoroughness and widely accepted standards of the National Board examinations, its certificate is accepted as a suitable qualification for the practice of medicine by 46 licensing authorities in the states, the District of Columbia, and the territories of the United States. A number of the boards of examiners in the basic sciences accept the examination of the National Board of Medical Examiners in lieu of their own examination.

TABLE 40.—*Candidates for Basic Science Certification, 1927-1958*

	No. of Boards	Examination			Reciprocity, Endorsement, Exemption, or Waiver	Total Certified
		Passed	Failed	% Failed		
1927........	5	294	33	10.0	27	321
1928........	5	617	88	12.4	19	636
1929........	7	641	93	12 6	75	716
1930........	7	636	127	16.6	122	758
1931........	7	634	153	19.4	141	775
1932........	7	634	101	13.7	118	752
1933........	8	557	104	15.7	131	688
1934........	9	751	115	13.3	138	889
1935........	10	794	162	16.8	114	908
1936........	10	917	181	16.4	243	1,160
1937........	12	1,102	242	18.0	202	1,304
1938........	12	1,096	230	17.3	293	1,389
1939........	14	1,110	249	18.3	1,021	2,131
1940........	16	1,293	290	18.3	346	1,639
1941........	17	1,751	373	17.5	353	2,104
1942........	17	1,725	497	22.3	304	2,029
1943........	18	2,309	410	15.1	382	2,691
1944........	18	2,144	605	22.0	309	2,453
1945........	18	2,339	634	21.3	584	2,923
1946........	19	2,558	692	21.2	1,474	4,032
1947........	19	2,633	905	25.6	960	3,593
1948........	19	3,038	789	20.6	1,418	4,456
1949........	20	3,656	1,515	29.5	1,480	5,136
1950........	20	3,430	1,340	28.1	2,526	5,956
1951........	21	3,198	735	18.7	1,939	5,137
1952.......	21	3,806	1,346	26.1	1,924	4,730
1953........	21	3,854	1,220	24.0	1,899	5,753
1954........	21	3,941	874	18.2	1,976	5,917
1955........	21	3,474	447	11.1	1,936	5,410
1956........	21	3,734	741	16.6	2,373	6,107
1957........	22	4,024	842	17.3	2,283	6,307
1958........	22	3,592	1,008	21.9	2,677	6,269
Total ...		66,282	17,141	20.5	29,787	95,069

TABLE 41.—*Basic Science Registration Fees*

Alaska	$25	Nebraska	$10
Arizona	20	Nevada	25
Arkansas	10[3]	New Mexico	50[4]
Colorado	25	Oklahoma	15[5]
Connecticut	25	Oregon	25
District of Columbia	25	Rhode Island	10
Florida	10	South Dakota	15
Iowa	10	Tennessee	25
Kansas	25	Texas	15[1]
Michigan	10	Washington	10
Minnesota	25[2]	Wisconsin	10

Fee for registration without examination: [1] $25; [2] $50; [3] $20, nonresidents; $25 reciprocity; [4] $75, reciprocity; $12.50 reexamination per subject; [5] $50, reciprocity; $10 reexamination.

The examinations are divided into three separate parts. Examinations in parts 1 and 2 are held at approved medical centers in the United States and Canada. Part 3 is administered by examining boards in 37 centers throughout the United States.

The National Board admits to its examinations any student or graduate of an approved medical school in the United States or Canada. A candidate is eligible for part 1 who has completed the formal courses of the first two years in an approved medical school; eligibility for part 2 calls for completion of a four-year medical course in an approved medical school; a candidate is eligible for part 3 if he has passed parts 1 and 2, received a degree of doctor of medicine, and served at least one year in an approved hospital internship.

Although previously accepting graduates of certain foreign medical schools, the National Board does not, at the present time, admit to its examinations leading to certification any graduates of medical schools outside the United States and its territories and Canada.

Upon receipt of a request initiated by a state licensing board, a specialty board, or a medical school, an individual may be admitted to certain National Board examinations in order to satisfy special requirements or regulations of the licensing board, specialty board, or the medical school. In such cases the individual is not considered a can-

TABLE 42.—*National Board Examinations in Part 1, 1922-1958*

Date	Total Examinations	Passed	Incomplete	Failed	% Failed
June, 1958............	3,161	2,074	810	277	11.8
September, 1958.......	1,049	369	620	60	14.0
Total................	4,210	2,443	1,430	337	12.1
1922....................	388	263	58	67	20.3
1923....................	507	349	77	81	18.8
1924....................	591	415	69	107	20.5
1925....................	608	400	50	158	28.3
1926....................	625	436	104	85	16.3
1927....................	702	452	159	91	16.8
1928....................	843	533	231	79	12.9
1929....................	1,096	675	331	90	11.8
1930....................	1,260	801	345	114	12.5
1931....................	1,277	755	425	97	11.4
1932....................	1,307	847	371	89	9.5
1933....................	1,234	782	316	136	14.8
1934....................	1,241	809	347	85	9.5
1935....................	1,264	785	410	69	8.1
1936....................	1,344	858	363	123	12.5
1937....................	1,435	871	415	149	14.6
1938....................	1,654	986	508	160	14 0
1939....................	1,733	1,048	460	225	17.7
1940....................	1,653	1,069	375	209	16.4
1941....................	1,640	1,087	346	207	16.9
1942....................	1,867	1,204	471	192	13.8
1943....................	2,656	1,441	962	253	14.9
1944....................	4,229	2,326	1,465	438	15.9
1945....................	3,865	2,106	1,475	284	11.8
1946....................	3,148	1,695	1,189	264	13.5
1947....................	3,514	1,844	1,352	318	14.7
1948....................	3,807	2,178	1,262	367	14.4
1949....................	3,823	2,337	1,243	243	9.4
1950....................	3,678	2,358	986	334	9.0
1951....................	3,520	2,153	1,038	329	9.3
1952....................	3,989	2,467	1,147	375	9.4
1953....................	4,278	2,866	980	432	13.0
1954....................	3,252	2,286	677	289	11.2
1955....................	3,196	1,735	1,173	288	14.2
1956....................	3,475	2,675	510	290	10.8
1957....	3,816	2,281	1,311	224	8.9
1958....................	4,210	2,443	1,430	337	12.1
Totals	82,725	50,616	24,431	7,678	13.2

didate for National Board certification. He is admitted to the examinations as a service to the board or school initiating the request and the grades are, therefore, sent only to the board or school concerned.

An increasing number of medical schools are finding National Board examinations useful as an impartial evaluation of their students in comparison with students of other schools. A medical school may use the National Board examinations for an entire class of students when the school wishes to have an objective extramural test in individual subjects or as a comprehensive examination. Twenty-nine medical schools are using to some degree the services of the National Board of Medical Examiners. Medical schools may also request that a foreign medical student who is being considered for admission to advanced standing be permitted to take National Board examinations in order to determine the level of his medical knowledge.

TABLE 43.—*National Board Examinations in Part 2, 1922-1958*

Date	Total Examinations	Passed	Incomplete	Failed	% Failed
April, 1958	2,393	2,328	5	60	2.5
June, 1958	232	212	10	4	1.8
Totals	2,625	2,540	15	64	2.4
1922	109	90	0	19	17.4
1923	192	170	2	20	10.5
1924	267	227	0	40	15.0
1925	342	309	0	33	9.6
1926	381	334	1	46	12.1
1927	361	314	1	46	12.8
1928	410	371	1	38	9.3
1929	465	399	19	47	10.5
1930	620	543	7	70	11.4
1931	719	630	2	87	12.1
1932	732	674	0	58	7.9
1933	714	651	0	63	8.8
1934	633	583	0	50	7.9
1935	689	620	0	69	10.0
1936	768	716	2	50	6.5
1937	855	803	1	51	6.0
1938	861	815	0	46	5.3
1939	938	884	0	54	5.8
1940	1,028	963	9	56	5.5
1941	1,001	954	1	46	4.6
1942	1,072	1,031	0	41	3.8
1943	1,861	1,805	0	56	3.0
1944	1,405	1,350	0	55	3.9
1945	1,599	1,565	0	34	2.1
1946	1,825	1,782	0	43	2.4
1947	1,641	1,613	0	28	1.7
1948	1,742	1,725	0	17	0.9
1949	1,737	1,691	0	46	2.6
1950	1,863	1,837	0	26	1.3
1951	2,045	2,017	0	28	1.4
1952	2,017	2,001	0	16	0.8
1953	2,200	2,145	1	54	2.4
1954	2,258	2,169	26	63	2.8
1955	2,220	2,181	3	36	1.6
1956	2,182	2,153	3	26	1.2
1957	2,151	2,115	18	18	0.8
1958	2,625	2,540	15	64	2.5
Totals	44,528	42,770	112	1,640	3.7

The most notable addition to the services rendered by the National Board is the preparation and administration of the examinations of the Educational Council for Foreign Medical Graduates.

The written examinations of parts 1 and 2 all are of the objective, multiple-choice type and may be taken by students during the course of their training in the medical school. Each of the six examinations of part 1 and part 2 is developed by a separate committee which is appointed by the Board and consists of about six members, including department heads, teachers, and clinicians with recognized prominence in their own fields. These committees have wide geographic distribution. Part 3 is a clinical and practical examination of the candidate's ability in critical observation, in diagnostic acumen, and in the principles of therapy. The examination is divided into four periods allocated to the four major elements of general practice. In addition, essay type examinations are included in the clinical subjects of part 3.

Examinations in part 1 were held during 1958 in June and September and in part 2 in April and June. The part 3 examination is given in late June with a small limited interim examination in the late fall.

The tables that are presented refer to the results of examinations in all three parts since 1922, including the number who passed and failed examination and the number certified. This is the 37th annual compilation of these statistics. The board's first examination was given in October, 1916. From that date and up to and including a test given in June, 1921, 11 examinations were given and 268 candidates were certified. Since 1922 the examination has been divided into three parts.

TABLE 44.—*National Board Examinations in Part 3, 1922-1958*

Year	Total Examinations	Passed	Failed	% Failed
1922	22	22	0	0.0
1923	82	81	1	1.2
1924	126	120	6	4.8
1925	219	206	13	5.9
1926	255	243	12	4.7
1927	293	272	21	7.2
1928	322	306	16	5.0
1929	352	337	15	4.3
1930	420	401	19	4.5
1931	437	419	18	4.1
1932	550	522	28	5.1
1933	551	526	25	4.5
1934	567	548	19	3.4
1935	598	578	20	3.3
1936	576	547	29	5.0
1937	668	630	38	5.7
1938	706	682	24	3.4
1939	770	729	41	5.3
1940	792	771	21	2.7
1941	910	885	25	2.7
1942	1,054	1,041	13	1.2
1943	1,230	1,213	17	1.4
1944	1,168	1,146	22	1.8
1945	1,245	1,232	13	1.0
1946	1,634	1,613	21	1.2
1947	1,741	1,723	18	1.0
1948	1,715	1,700	15	0.9
1949	1,685	1,674	11	0.6
1950	1,752	1,736	16	0.9
1951	1,738	1,708	30	1.7
1952	2,128	2,036	92	4.3
1953	2,039	1,979	60	2.9
1954	2,133	2,052	81	3.8
1955	2,090	2,077	13	0.6
1956	2,085	2,072	13	0.6
1957	2,010	1,998	12	0.6
1958	2,023	2,011	12	0.6
Totals	38,686	37,836	850	2.2

Tables 42 and 43 record the results of examinations given in parts 1 and 2 during 1958 and for each year since 1922. The data shown in these tables represent examinations conducted rather than persons examined, and the figures thus include candidates who fail and are reexamined during the same year and those who may pass parts 1 and 2 in the same year. The examination in part 1, and occasionally in part 2, may be divided and taken at more than one examination period. Four or five subjects may be taken at one time and the remaining subjects of the part taken later. Candidates so examined during 1958 are listed in the tables under the heading of a column titled incomplete.

There were 4,210 examinations in part 1 given in 1958; 2,443 candidates passed, and 337, or 12.1%, failed. Incomplete examinations numbered 1,430. In part 2, 2,625 examinations were held, 2,540 passed, and 64, or 2.5%, failed. Fifteen incomplete examinations were given.

TABLE 45.—*Diplomates from Individual Medical Schools, 1958*

United States	
Medical College of Alabama.	2
University of Arkansas......	3
College of Medical Evangelists..................	39
University of California, Los Angeles................	1
University of Southern *California*..................	1
Stanford University.........	21
University of California, *San Francisco*..............	1
University of Colorado......	3
Yale University.............	75
	81
	78
Howard University..........	5
University of Miami.........	12
Emory University............	2
Chicago Medical School......	66
Northwestern University.....	56
	43
	45
	18
	3
	15
	8
	2
Johns Hopkins University...	8
University of Maryland......	4
Boston University...........	68
Harvard Medical School.....	111
Tufts University Medical School......................	115
University of Michigan......	4
Wayne State University.....	1
University of Minnesota.....	1
University of Missouri.......	3
St. Louis University.........	8
Washington University......	10
Creighton University........	27
University of Nebraska......	3
Albany Medical College......	49
University of Buffalo.......	66
Columbia University........	107
Cornell University...........	76
New York Medical College...	98
New York University.........	113
State University of New York, Brooklyn.......	145
University of Rochester.....	58
State University of New York, Syracuse........	60
Duke University..............	7
Western Reserve University..	41
Ohio State University........	1
University of Oregon........	17
Hahnemann Medical College of Philadelphia............	9
Jefferson Medical College....	11
Temple University...........	8
University of Pennsylvania..	33
Woman's Medical College of Pennsylvania...........	18
University of Pittsburgh.....	2
University of Puerto Rico...	23
University of Tennessee......	1
Vanderbilt University........	3
University of Texas..........	1
University of Utah...........	1
University of Vermont.......	30
Medical College of Virginia..	4
University of Washington...	6
University of Wisconsin.....	2
Marquette University........	6
Total......................	1,939
United States (no longer in operation)	
Rush Medical College........	1
Canada	
University of Alberta........	1
University of British	
	2
	3
	1
	3
University of Western *Ontario*.....................	2
	9
	2
	40
Total......................	63
Foreign	
University of Havana, Cuba	1
University of London, England.....................	1
University of Teheran, Iran.	1
American University of Beirut, Lebanon..........	1
University of Leiden, Netherlands...............	2
University of Lausanne, Switzerland..............	2
Total.....................	8

From 1922 to 1958, inclusive, a total of 82,725 examinations have been given in part 1 and 44,528 in part 2. In the 37-year period shown, there have been 7,678 failures in part 1 (13.2%), and 1,640 (3.7%) in part 2.

In 1958, 2,023 tests were given in part 3; 2,011 candidates passed and 12 (0.5%) failed. Results of examinations in part 3 in 1958 and in the 36 preceding years are given in table 44. In the 37-year period 38,686 were tested, of whom 37,836 were granted the certificate of the board. The percentage of failures in the board's final examination for this period was 2.2.

The 2,011 physicians certified as diplomates in 1956 represented 65 medical schools in the United States and Puerto Rico, one United States medical school no longer in operation, 9 in Canada, and *6 schools in other countries. The school and the* number of examinees from each are included in table 45.

TABLE 46.—*Licenses Granted on the Basis of National Board Certificates, 1958*

Alabama	6	New Hampshire	16
Alaska	5	*New Jersey*	144
Arizona	19	New Mexico	5
California	608	New York	964
Colorado	20	*North Dakota*	5
Connecticut	161	Ohio	92
Delaware	4	Oklahoma	6
District of Columbia	71	*Oregon*	25
Georgia	15	Pennsylvania	120
Idaho	4	Rhode Island	15
Illinois	95	*South Carolina*	4
Iowa	18	South Dakota	3
Kansas	6	Tennessee	14
Kentucky	22	*Utah*	13
Maine	21	Vermont	20
Maryland	90	Virginia	47
Massachusetts	292	*Washington*	48
Michigan	22	West Virginia	11
Minnesota	52	Wisconsin	29
Mississippi	3	*Wyoming*	2
Missouri	33	Hawaii and Puerto Rico	47
Montana	9		
Nebraska	2	Totals......................	3,215
Nevada	7		

In 1958, there were 3,215 licenses to practice medicine issued by endorsement of the certificate of the National Board of Medical Examiners in 43 states, the District of Columbia, Hawaii, and Puerto Rico. The number registered by each of these licensing boards is recorded in table 46. There have been 41,670 licenses issued on the basis of endorsement of the certificate of the National Board of Medical Examiners since 1915.

In 1958, there were 464 medical students who took part 1 and 889 who took part 2, not as candidates for National Board certification but only as a requirement of their own medical school. During the year, also, a total of 54 individuals who had two or more years of medical education in a foreign medical school and who were being considered for admission to a medical school in the United States were examined in either part 1 or part 2.

The National Board allows one reexamination in the event of failing a part. If a candidate fails for a second time, permission to take the examination for a third time is given only by special permission of the board and only if the candidate can demonstrate to the satisfaction of the board that there are special reasons justifying examination.

The corresponding officer of the National Board of Medical Examiners is Dr. John P. Hubbard, Executive Secretary and Treasurer. The address of the board is 133 S. 36th St., Philadelphia 4.

MEDICINE AND THE LAW

LIABILITY OF GOVERNMENTAL HOSPITALS FOR NEGLIGENCE

"The King can do no wrong!" This is the legal maxim which prevailed under English common law. The American common law adopted the principle of sovereign immunity, investing the state and federal governments with the royal privileges. Hence, state and federal governmental units have generally enjoyed a freedom from suits based upon negligence.

By statute, the sovereign immunity has been diminished in many instances, thus allowing certain kinds of suits against governmental agencies. Such action, of itself, does not necessarily make for liability unless the courts interpret these statutes, or other laws of the jurisdiction, as allowing governmental subdivisions to be liable for the negligence of their employees or agents.

The federal government hospitals remained immune from liability until the Federal Tort Claims Act waived the sovereign protection. Similarly, hospitals operated by states have retained their cloak of immunity unless the common law rule has been abrogated by statute.

Counties and municipalities do not fit so clearly into the traditional concepts of sovereign immunity. Most courts, however, have considered counties and cities to be instrumentalities created by the state legislatures and entitled to the benefits of the immunity of the parent body. This does not mean that city and county hospitals automatically enjoy the immunity which might apply, for example, to a fire department. In fact, some courts have distinguished the functions of a governmental unit created by a state and have determined that certain activities are governmental in nature, that is, are required for performance of the government's purposes, while other activities are proprietary, i. e., similar to or competitive with private business.

Whether operation of a hospital by a city or county is a governmental or a proprietary activity determines, in many jurisdictions, whether the hospital will enjoy immunity from liability for negligence. It is more of a legal conclusion than a factual finding, however, since the same activity may be considered governmental in one state and proprietary in another. This distinction constitutes the basis for the prevailing theory. There are numerous additional or subordinate theses, however. For instance:

In a few states the courts have concluded that if voluntary nonprofit hospitals enjoy charitable immunity, the governmental hospitals should also be immune from liability.

If a statute permits a governmental unit to operate a hospital but does not make this activity a mandatory one, a number of courts have held that the hospital, nevertheless, is clothed with sovereign immunity.

A few cases indicate that a county, as distinguished from a municipal corporation, is clearly performing a governmental function when it operates a hospital, and thus deserves to be free from liability.

Some courts felt so strongly about governmental immunity that they have supported it even upon a showing of gross negligence or wanton disregard for the safety of others.

Although the incorporation statute or its charter may allow a governmental unit to sue and be sued, courts have often held that this does not affect the immunity from liability for negligence enjoyed by governmental hospitals; the suit must be for some reason other than negligence, unless such immunity has been specifically waived.

If the corporate charter, or other legislative action by which the governmental hospital was authorized, enumerates the powers granted, and the injury complained of resulted from an activity not specifically authorized, most courts have held that the hospital continues to be immune; an act outside the apparent scope of authority does not customarily threaten liability for a governmental hospital.

Even if a governmental hospital acquires liability insurance as a precautionary measure, its immunity should not be affected, some courts hold.

In a number of states governmental hospitals have been held liable. The rationale of the courts has included these views:

If it is not mandatory for the governmental unit to operate a hospital, such activity is not considered governmental but rather is proprietary and governmental immunity is not applicable.

Receiving paying patients is inconsistent with a governmental function, hence there should be liability at least insofar as paying patients are concerned.

If voluntary nonprofit hospitals are liable in the state, governmental hospitals should be in no different position.

If the hospital has purchased liability insurance, immunity is waived at least to the extent of insurance coverage.

In the realm of voluntary nongovernmental hospitals, there is an unmistakable trend away from immunity and toward liability. Many states, through court decisions, have switched in the past few years. The courts in these states have decried charitable immunity as an anachronism out of step with contemporary concepts of justice. To a lesser extent, the courts have also been saying that governmental immunity in the hospital field is a harsh doctrine and should be set aside since the reasons for this rule also no longer exist; now that government is engaged in so many ventures which have not been included in its traditional functions, liability would be more appropriate.

The courts have not been in a position to reverse the immunity holdings relative to governmental hospitals as readily as with voluntary institutions, however. It is generally recognized that

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This material was prepared by the Joint Committee on Professional Liability of the American Medical Association and the American Hospital Association.

legislative action is necessary to remove governmental immunity once the immunity has been established. This has been done in New York state via the Court of Claims Act, by the Federal Tort Claims Act for United States hospitals, and through interpretation of the Hospital Authority Act in Georgia.

There is a trend toward liability in governmental hospitals. Some recent court decisions in states which have considered the question for the first time indicate this, and further legislative action may be expected in other states. Insurance coverage to protect against this liability is generally available both for the hospital and for its employees (who, in any case, might be personally liable even if the hospital enjoys immunity).

CHART SHOWING TORT LIABILITY OF GOVERNMENTAL HOSPITALS TO PATIENTS

(Unless commented upon, it may be assumed that state owned institutions are immune from tort liability.)

ALABAMA

A public hospital corporation such as a county hospital, authorized by statute, performs a governmental function and is *immune* from liability to indigent or paying patients. *Garret v. Escambia County Hospital Bd.*, 94 So. 2d 762 (Ala., 1957).

ALASKA

Political subdivisions are *liable* for the negligence of their servants in operating hospitals to the same extent as private individuals, *Tuengel v. Sitka*, 118 F. Supp. 399 (D.C., Alaska, 1954), and possibly the state is liable as well under a special statute. Alaska Comp. Laws. Ann. §§ 56-7-1, 56-7-7 (Supp. 1958).

ARIZONA

A county hospital is engaged in a governmental function and is *immune* from negligence liability. *Lee v. Dunklee*, 326 P. 2d 1117 (Ariz., 1958).

ARKANSAS

No cases reported.

CALIFORNIA

County hospitals are *immune* from liability for "malpractice" injuries arising out of their operation, *Calkins v. Newton*, 36 Cal. App. 2d 262, 97 P. 2d 523 (1940); "District Hospitals" are likewise *immune* from liability, even to paying patients, *Talley v. Northern San Diego County Hospital District*, 41 Cal. 2d 33, 257 P. 2d 22 (1953). There is *liability*, however for dangerous or defective condition of county hospital property, *Burns v. American Casualty Co.*, 127 Cal. App. 2d 198, 273 P. 2d 605 (1954); and probably *liability* to paying patients in municipal hospitals, *Beard v. City and County of San Francisco*, 79 Cal. App. 2d 753, 180 P. 2d 744 (1947).

COLORADO

City and county hospitals are engaged in governmental activities and are thus *immune* from tort liability. *Schwalb v. Connely*, 116 Colo. 195, 179 P. 2d 667 (1947).

CONNECTICUT

No cases reported.

DELAWARE

No cases reported, but sovereign immunity is waived, by statute, if liability insurance exists. Del. Code Ann. Title 18 § 516 (Supp. 1958).

DISTRICT OF COLUMBIA

Federally owned hospitals would be *liable* within the provisions of the Federal Tort Claims Act. See discussion under "Federal" Hospitals owned by the District retain tort *immunity*. *Calomeris v. District of Columbia*, 125 F. Supp. 266 (D.C.D.C., 1954).

FLORIDA

A city is *liable* for negligent injuries received by a patient. *Goff v. Ft. Lauderdale*, 65 So. 2d 1 (Fla., 1953). County hospital is liable also. *Bourgeois v. Dade County*, 99 So. 2d 575 (Fla., 1957).

GEORGIA

A hospital organized under the Hospital Authority Act is *liable* for its torts. *Hall v. Hospital Authority of Floyd County*, 99 S.E. 2d 708 (Ga. App., 1957).

HAWAII

No reported cases. Federal hospitals would be *liable* within the provisions of the Federal Tort Claims Act. See discussion under "Federal."

IDAHO

Where a county is required by law to provide hospital care only for the indigent, there is *liability* to paying patients in a county hospital. *Henderson v. Twin Falls County*, 56 Idaho 124, 50 P. 2d 597 (1935). Also, by statute, state hospitals are liable to the extent of their insurance coverage. Id. Code §§ 41-3304, 3305 (Supp. 1957).

ILLINOIS

A government-owned hospital is devoted to public purposes and is *immune* from liability in absence of statutory provision to the contrary. *Olander v. Johnson*, 258 Ill. App. 89 (1930). A city-owned hospital is also *immune* either as a charity or because it promotes the public welfare under the general police powers. *Tollefson v. Ottawa*, 228 Ill. 134, 81 N.E. 823 (1907).

INDIANA

A city hospital performs a governmental function and is *immune* from tort liability. *Scott v. Indianapolis*, 75 Ind. App. 387, 130 N.E. 658 (1921).

IOWA

A county hospital is a proprietary function, at least insofar as paying patients are concerned; hence *liability* to paying patients. *Wittmer v. Letts*, 80 N.W. 2d 561 (Iowa, 1957).

KANSAS

Activities of a city hospital are proprietary and give rise to *liability* to a paying patient. *Stolp v. Arkansas City*, 180 Kan. 197, 303 P. 2d 123 (1956).

KENTUCKY

A city hospital performs a governmental function and is *immune* from liability for negligence. *Van Pelt v. Louisville*, 257 Ky. 256, 77 S.W. 2d 942 (1934). A Board of Claims hears claims against the state for negligent acts and may pay up to $10,000. Ky. Rev. Stat. Ann. § 44.070 (Supp. 1958).

LOUISIANA

Operation of a hospital by a governmental unit is a governmental activity and *immune* from tort liability. *Messina v. Societe Francaise De Bienfaissance*, 170 So. 801 (La. App., 1936). If a governmental hospital is covered by liability insurance, the insurer possibly may be liable to the amount of insurance.

MAINE

A hospital operated under legislative authority generally is *immune*, except for *liability* to paying patients. *Anderson v. Portland*, 130 Me. 214, 154 A. 572 (1931).

MARYLAND

Governmental *immunity* applies to governmental hospitals. *Thomas v. Board of County Commissioners*, 92 A. 2d 452 (Md. App., 1952). Whether a governmental hospital, if insured, is subject to tort liability to the extent of its coverage has not yet been determined. Ann. Code of Md., Art. 48A, § 85 (1957).

MASSACHUSETTS

A city hospital is *immune* from tort liability even if there has been gross negligence. *Young v. Worcester*, 253 Mass. 431, 149 N.E. 204 (1925).

MICHIGAN

City hospitals are *immune* as a governmental function. *Martinson v. Alpena*, 328 Mich. 595, 44 N.W. 2d 148 (1950); general charitable *immunity* also applies to government charitable functions such as a state university hospital. *Robinson v. Washtenaw Circuit Judge*, 228 Mich. 225, 199 N.W. 618 (1924).

MINNESOTA

A government agency is *liable* for negligence in its proprietary functions, which would include operation of a general hospital. *Swigerd v. Ortonville*, 75 N.W. 2d 217 (Minn., 1956); *Borwege v. Owatonna*, 190 Minn. 394, 251 N.W. 915 (1933).

MISSISSIPPI

Operation of a hospital by a governmental unit is considered a government function, hence *immunity* from tort liability. *Jones v. Amory*, 184 Miss. 161, 185 So. 237 (1939). No liability to paying patients, either. *Leland v. Leach*, 86 So. 2d 363 (Miss. 1956).

MISSOURI

Operation of a hospital is a proper function of government and brings *immunity*. *Schroeder v. City of St. Louis*, 360 Mo. 293, 228 S.W. 2d 677 (1950).

MONTANA

No cases reported.

NEBRASKA

No cases reported.

NEVADA

County hospital created under statute is not a legal entity and cannot be sued for negligence. *Bloom v. Southern Nevada Memorial Hospital*, 275 P. 2d 885 (Nev., 1954). Whether the county itself is responsible for hospital torts is not yet determined.

NEW HAMPSHIRE

Operation of a hospital by a city, under legislative authority, is considered a proprietary activity and is subject to tort *liability*. *Kardulas v. Dover*, 99 N.H. 359, 111 A. 2d 327 (1955).

NEW JERSEY

Immunity from liability for government hospitals, except that in cases of "active wrongdoing" or "positive misfeasance," as contrasted with ordinary negligence, there is liability. *Kress v. Newark*, 8 N.J. 562, 86 A. 2d 185 (1952).

NEW MEXICO

Operation of a governmental hospital is a governmental function; county hospital is *immune* from tort liability. *Elliott v. Lea County*, 58 N.W. 147, 267 P. 2d 131 (1954).

NEW YORK

Under Section 8, Court of Claims Act, the state waives its immunity. *Liability* of state, county, town, city and village hospitals is determined as if they were private individuals or corporations. *Becker v. City of New York*, 2 N.Y. 2d 226, 140 N.E. 2d 262 (1957). There is also *liability* of municipal corporations for the malpractice of doctors or dentists occurring in municipal hospitals if the professional services are rendered gratuitously in a charity case. Section 50-d, New York General Municipal Law (1956).

NORTH CAROLINA

Governmental *immunity* applies even to paying patients in a city-county hospital. *Hitchings v. Albemarle Hospital*, 220 F. 2d 716 (CA 4th, N.C., 1955). The state is liable up to $10,000, *under a special statute, for negligent acts. Gen.* Stat. of N. C. § 143-291 (1958).

NORTH DAKOTA

No cases reported.

OHIO

Municipally operated hospitals promote the public health, constitute a governmental function, and are *immune* from tort liability. *Lloyd v. Toledo*, 42 Ohio App. 36, 180 N.E. 716 (1931).

OKLAHOMA

A city hospital is a proprietary activity and is subject to tort *liability*. *Okmulgee v. Carlton*, 180 Okla. 605, 71 P. 2d 722 (1937).

OREGON

No cases reported.

PENNSYLVANIA

Immunity of governmental hospitals in Pennsylvania is a long standing rule of law. *Hand v. Philadelphia*, 8 Pa. Co. 213 (1890).

PUERTO RICO

The governmental nature of a public municipal hospital brings *immunity* from tort liability. *Villegas v. San Juan*, 19 P.R. 397 (1913).

RHODE ISLAND

No cases reported.

SOUTH CAROLINA

Governmental hospitals are *immune* from tort liability in absence of a statute to the contrary. *Mullins Hospital v. Squires*, 104 S.E. 2d 161 (S.C., 1958).

SOUTH DAKOTA

County functions, such as operating a hospital, are clothed with governmental *immunity*. *Jerauld County v. St. Paul-Mercury Indemnity Co.*, 71 N.W. 2d 571 (S.D., 1955).

TENNESSEE

Governmental hospitals derive an *immunity* from tort liability because they constitute a governmental function. *Lane v. Knoxville*, 170 Tenn. 482, 96 S.W. 2d 769 (1936). If covered by liability insurance, a municipal hospital waives immunity to the extent of coverage. *McMahon v. Baroness Erlanger Hospital*, 306 S.W. 2d 41 (Tenn. App., 1957).

UTAH

No cases reported.

VERMONT

No cases reported.

VIRGINIA

There is *immunity* from tort liability for governmental hospitals created under statutory authority. *Maia v. Eastern State Hospital*, 97 Va. 507, 34 S.E. 617 (1899).

WASHINGTON

By statute there is *immunity* for governmental hospitals from liability for the negligence of employees, agents, and officers. *Gile v. Kennewick, Public Hospital District*, 48 Wash. 2d 774, 296 P. 2d 662 (1956).

WEST VIRGINIA

A county hospital authorized by statute is a governmental activity and is *immune* from liability for negligence. *Shaffer v. Monongalia General Hospital*, 135 W. Va. 163, 62 S.E. 2d 795 (1950).

WISCONSIN

Governmental hospitals are *liable* for their proprietary functions. *Carlson v. Marinette County*, 264 Wis. 423, 59 N.W. 2d 486 (1953).

WYOMING

No cases reported.

FEDERAL

The Federal Tort Claims Act, 28 USC 2671 et. seq., provides for *liability* of the United States (except for interest prior to judgment and punitive damages) "in the same manner and to the same extent as a private individual under like circumstances." While the law of the place of injury usually governs, any governmental immunity in a state would be ignored since "private individuals" do not enjoy such immunity. Malpractice by a physician employed by the United States would be actionable against the United States. *Dishman v. U. S.*, 93 F. Supp. 567 (D.C. Md., 1950), except where the injured person is a serviceman treated as an "incident to the service." *Feres v. U. S.*, 340 U.S. 135 (1950).

FOREIGN

In England and Canada, where the general system of law is similar to that of the United States, a governmental body operating a hospital is liable for negligence just as a private individual or corporation would be under similar circumstances. *Cassidy v. Ministry of Health*, 2 K.B. 343 (1951) [Great Britain]; *Nyberg v. Provost Municipal Hospital Board*, Can. S.C.R. 226 (1927) [Canada].

This article is being published simultaneously in the June 1 issue of *Hospitals*.

MEDICAL NEWS

CALIFORNIA

Dr. Allen Named Department Head.—Dr. J. Garrott Allen, University of Chicago, was named to head the Stanford University Medical School's department of surgery. Dr. Allen will commence his new duties on July 1, just prior to the opening of the Medical School's new 22-million-dollar facilities nearing completion on the Palo Alto campus. He is professor of surgery and attending surgeon at the University of Chicago Clinics, where he has served continuously since 1938.

Dr. Whalman Honored.—Dr. Harold F. Whalman, chairman of ophthalmology at the College of Medical Evangelists, Los Angeles, will receive the Distinguished Nevadan Award during commencement ceremonies at the University of Nevada on June 1, "in recognition of [his] significant contribution to the scientific and social advancement of our nation." Dr. Whalman received his bachelor of arts degree from the University of Nevada in 1922. Since 1935, he has been a member of the faculty at the College of Medical Evangelists.

ILLINOIS

Mental Health Observance.—Governor William G. Stratton proclaimed the period April 26 to May 19 as "Eleventh Annual Mental Health Observance in Illinois." Governor Stratton's official proclamation urged "all citizens to join in the observance, visiting a state mental institution if possible, to the end that public awareness of the problem will stimulate the enlightened public action essential to a solution." More than 100 public and private agencies and organizations joined the Illinois Department of Public Welfare as co-sponsors of the statewide observance. The 11th annual Mental Health Dinner was held in Springfield May 19, featuring Dr. Robert H. Felix, director, National Institute for Mental Health, as guest speaker.

Chicago

Meeting of Rush Alumni.—The Alumni Association of Rush Medical College will hold a meeting June 9, 12:30 p. m., at the Shelburne Hotel, Atlantic City, N. J., under the presidency of Dr. Lowell D. Snorf, Chicago. For information, write Dr. James W. Merricks, Secretary, Alumni Association of Rush Medical College, 1758 W. Harrison St., Chicago 12. Luncheon fee is $5.

Personal.—Dr. John A. D. Cooper, professor of biochemistry, was named associate dean of Northwestern University Medical School. Since 1956, Dr. Cooper has been assistant dean. Dr. Cooper organized a course on the application of nuclear physics in biology and medicine which he first taught in 1949, reportedly the first of its kind offered in medical schools.——John H. Rust, D.V.M., project director, department of food technology, Massachusetts Institute of Technology, Cambridge, was made head of the newly established Section on Nuclear Medicine at the University of Chicago's School of Medicine.

MASSACHUSETTS

Annual Lecture.—Dr. James H. Means, Jackson Professor of Clinical Medicine, Emeritus, at Harvard and former chief of medical services at the Massachusetts General Hospital, delivered the annual Gay Lecture on Medical Ethics at the Harvard Medical School, Boston, on "Profession or Business" May 13. The Gay Lectures were established at Harvard in 1917 by Dr. George W. Gay, a graduate of Harvard Medical School.

Medical Center Established.—Formation of a Boston University–Massachusetts Memorial Hospitals Medical Center, to continue and enlarge "the cooperative enterprises of the two institutions in the advancement of patient care, of education in medicine and other health services, and of research," was announced May 2 by President Harold C. Case, of Boston University. The move converts to a formal association the informal cooperation which has existed over a period of years between the Boston University School of Medicine and its principal teaching hospital, the Massachusetts Memorial, located in Boston's South End. The Medical Center will be governed by a joint administrative board, composed of the presidents and three representatives each from the trustees of the university and the hospitals and a member-at-large elected by the other eight. The board will have over-all supervision of the Medical Center, including medical education, medical care, research, and any other training programs conducted by any unit of the center. A full-time director of the medical center, who will serve as chief executive officer of the board and the center, will be appointed. The cost of establishing the center and paying for the services of the director and the expenses of his office will be shared equally by the university and the hospitals, President Case said. The offices of dean of the School of Medicine

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Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education, and public health. Programs should be received at least three weeks before the date of meeting.

and administrator of the hospitals will continue, and final authority for the program of each institution will remain with its respective board of trustees.

MINNESOTA

Dr. Pruitt Goes to Texas.—Dr. Raymond D. Pruitt, a consultant in internal medicine in the Mayo Clinic since 1943, associate director of the Mayo Foundation from 1954 to 1956, and professor of medicine in the Mayo Foundation, Graduate School, University of Minnesota, will leave that institution on July 1 to become chairman, department of medicine, Baylor University College of Medicine, Houston, Texas. The appointment includes assignment as physician-in-chief to the Jefferson Davis Hospital and chief consultant in medicine to the Veterans Administration Hospital, Houston.

MONTANA

New President.—Dr. Thaddeus L. Lockridge, Whitefish, succeeded to the office of president of the Flathead County Medical Society and will complete the unexpired term of Dr. Kenneth J. Lampert, who is moving to New Mexico to join the staff of the New Mexico Hospital for Retarded Children.

Society News.—The annual meeting of the Montana Society of Pathologists was held Feb. 7, 1959, in Butte. Newly elected officers for the present year are: president, Dr. Ernst J. Eichwald, of the Montana Deaconess Hospital, Great Falls, and secretary-treasurer, Dr. John P. Pfaff, of Columbus Hospital, Great Falls.

Rehabilitation Meeting.—The 1959 annual meeting of the Montana Association for Rehabilitation, under the presidency of Dr. Jesse T. Schwidde, will be held in Billings, June 17-18, at Marillac Hall. The theme will be "Rehabilitation in Action," and the program will include progress reports from various areas and agencies in the state as well as the annual business meeting. The scientific program will include clinical evaluation demonstrations, pediatric rehabilitation problems, geriatrics, and a discussion of osteoarthritis and paraplegic cases. Dr. Howard A. Rusk, chairman, department of physical medicine and rehabilitation, New York University–Bellevue Medical Center, and Dr. Ross T. McIntyre, executive director, International College of Surgeons, will participate. Also included on the program will be a tour of the new rehabilitation unit of St. Vincent's Hospital, Billings. On Thursday evening, June 18, the association will hold its annual banquet at the Northern Hotel at 7:30 p. m.

NEW HAMPSHIRE

Dr. Lobitz Goes to Oregon.—Dr. Walter C. Lobitz Jr., professor of dermatology, Dartmouth Medical School, and chief of the department of dermatology at Hitchcock Clinic in Hanover, was named professor and head of the division of dermatology at the University of Oregon Medical School, Portland, effective July 1. He succeeds Dr. Thomas B. Fitzpatrick, who accepted a similar position at Harvard University Medical School, Boston. Dr. Lobitz was a fellow in dermatology and syphilology at the Mayo Foundation from 1942 to 1945 and became a diplomate of the American Board of Dermatology in 1947.

OHIO

State Medical Election.—Dr. Frank H. Mayfield, Cincinnati neurosurgeon, was installed as president of the 113-year-old Ohio State Medical Association April 23, and Dr. Edwin H. Artman, Chillicothe general practitioner, was selected as president-elect. Dr. Artman will be installed as president at the 1960 annual meeting in Cleveland. Retiring president was Dr. George A. Woodhouse, Pleasant Hill general practitioner. Elected to serve on the Council are Dr. Ray M. Turner, Springfield; Dr. Wendell Green, Toledo; Dr. Robert E. Tschantz, Canton; Dr. Robert M. Inglis, Columbus; and Dr. William D. Monger, Lancaster (reelected).

TEXAS

Foundation for Research in Psychiatry.—Plans for newly formed Timberlawn Foundation for Education and Research in Psychiatry were set up by the board of trustees at their regular meeting in Dallas. These include proposed invitations to leading psychiatrists and scientists to teach and do research at Timberlawn and give public lectures. Besides the stepped-up training of residents in psychiatry, of externs and interns, of therapists and nurses at Timberlawn, several areas of research already underway will be continued, including a review of 12,000 cases of mental illness treated at Timberlawn since 1917, clinical research on schizophrenic ability to handle abstract concepts, research on an attempt to predict the therapeutic results in schizophrenics, and research on the husbands of schizophrenic wives. Psychiatric counseling of business executives and religious leaders will be expanded. Long-range plans include an endowment fund of $1,500,000, three buildings to allow expansion of research and education program, and a memorial lectureship under which "eminent psychiatrists" will be invited to work with the foundation for a full year. Timberlawn Foundation is a nonprofit organization formed last year by a group of Dallas business and professional men to carry on and expand the research and education program which has been carried on at Timberlawn Sanitarium for many years. Specific aims of the foundation are to promote psychiatry and its related sciences, to give scientists an opportunity to do research, and to train physicians, nurses, and therapists in mental illness.

WYOMING

Annual Meeting in Moran.—The 56th annual meeting of the Wyoming State Medical Association will be held at Jackson Lake Lodge, Moran, June 11-13, under the presidency of Dr. L. Harmon Wilmoth, Lander. The House of Delegates will convene the morning of June 12. Two movies are scheduled, "Open-Heart Surgery Using the Kay–Anderson Heart–Lung Machine," by Dr. Jerome H. Kay, Beverly Hills, Calif., and "Cold Coning of the Uterine Cervix," by Dr. Harry W. Seiger, Santa Monica, Calif. Participants include the following: Drs. Ralph C. Benson, Portland, Ore.; Ralph M. Stuck, Denver; Edward H. Rynearson, Rochester, Minn.; H. Mason Morfit, Denver; John M. Salyer, Denver; Charles H. Scheifley, Rochester, Minn.; Alan R. Mortiz, Cleveland; and Edgar J. Poth, Galveston, Texas. Registration fee is $25, with medical students admitted free. For information, write Mr. Arthur R. Abbey, Box 2036, Cheyenne, Wyo., Executive Secretary.

GENERAL

National Recreation Month.—The National Recreation Association announced that June has been proclaimed National Recreation Month with the theme "Find New Worlds Through Recreation." The four weeks of the month, "designed to show the value and scope of leisure time activities," are Youth Fitness Week, Family Recreation Week, Arts and Recreation Week, and Service-Through-Recreation Week. Recreation Month materials are available from the National Recreation Association by writing the Public Information and Education Department, 8 W. Eighth St., New York 11.

Gastroenterology Meeting in Atlantic City.—The eighth meeting of the Gastroenterology Research Group will be held in Trimble Hall, Claridge Hotel, Atlantic City, the afternoon of June 4. The meeting will be a symposium on "Fine Structure as Related to Absorption, Synthesis and Transport in the Gastrointestinal Tract." The program has been arranged by Dr. Wade Volwiler, Seattle and Dr. Albert I. Mendeloff, Baltimore, and will be moderated by Dr. H. Stanley Bennett, Seattle. An informal dinner will follow the afternoon meeting. The group, in cooperation with the American Gastroenterological Association, will sponsor a morning program, the Gastroenterological Research Forum, which will consist of a series of 10-minute papers.

Meeting on Diabetes.—The 19th annual meeting of the American Diabetes Association will be held June 6-7 at the Chalfonte–Haddon Hall, Atlantic City, N. J., under the presidency of Dr. Alexander Marble, Boston. A total of 24 papers are scheduled for presentation in addition to 16 papers to be read by title. At the banquet June 6, 7:30 p. m., following an address by Dr. Marble, awards will be presented as follows: the Lilly Award to Dr. Marvin D. Siperstein, Dallas; a Banting Medal to Dr. George W. Thorn, Boston; a Banting Medal to Dr. E. T. Bell, Minneapolis. Dr. Boland Hughes, Philadelphia, will present "The Contemporary Scene in the U. S. S. R." at the banquet. A panel discussion on "Oral Hypoglycemic Agents" will be moderated by Dr. Garfield G. Duncan, Philadelphia, on the afternoon of June 7.

Geriatric Meeting in Atlantic City.—The 16th annual meeting of the American Geriatrics Society will be held June 4-5 at the Hotel Traymore, Atlantic City, N. J., under the presidency of Dr. Warren H. Cole, Chicago. Ten papers are scheduled for presentation, and the following panel discussions and moderators are planned:

Problems of the Aged in Industry, Dr. George C. Dowd, Worcester, Mass.
Concepts of the Medical Profession in Relation to Aging, Dr. Joseph D. McCarthy, Omaha.
Surgery in the Aged, Dr. Frank Glenn, New York City.
Advances in the Diagnosis and Treatment of Cerebrovascular Disease, Dr. Irving S. Wright, New York City.

The annual reception and dinner will be held June 4, 6:30 p. m. For information, write Dr. Richard J. Kraemer, 2907 Post Rd., Warwick, R. I., Secretary-Treasurer.

Meeting of Gastroscopic Society.—The 18th annual meeting of the American Gastroscopic Society will be held June 7 in Haddon Hall, Atlantic City, N. J. The program includes the following symposiums and moderators:

Gastroscopic Color Photography, Dr. Frank B. McGlone, Denver.
Endoscopic Biopsy of the Stomach, Dr. C. Wilmer Wirts, Philadelphia.
Instruments and Techniques for Esophagoscopy, Dr. Herman J. Moersch, Rochester, Minn.

The annual banquet at 7:30 p. m. will conclude the meeting, with Capt. Finn Ronne presenting "Exploring Antarctica." Dr. J. Edward Berk, Detroit, president of the society, will preside at the banquet. For information, write Dr. Arthur M. Olsen, 200 First St., S. W., Rochester, Minnesota, Secretary-Treasurer.

Italian Psychiatrist Receives Travel Award.—In ceremonies held during the annual convention of the American Psychiatric Association meeting, Dr. Ugo Cerletti, professor of neuropathology and psychiatry, University of Rome, was made a Laureate of the Purdue Frederick Medical Achievement Travel Award. Dr. Cerletti was cited for his "long and outstanding record of important research contributions in the science of psychiatry." The award winner is known for the introduction of electric convulsive treatment in psychiatric therapy. The Medical Achievement Travel Award is sponsored by The Purdue Frederick Company of New York and is administered by the International Council for Health and Travel. The award enables recipients to attend and participate in medical and scientific meetings here and abroad to "further the international exchange of scientific and medical research on a physician-to-physician basis."

Society News.—The American Academy for Cerebral Palsy officers for this year are as follows: Drs. Alvin J. Ingram, Memphis, Tenn., president; Raymond R. Rembolt, Iowa City, president-elect; Temple S. Fay, Philadelphia, vice-president; Glidden L. Brooks, Providence, R. I., secretary; and Samuel B. Thompson, Little Rock, Ark., treasurer. The 1959 annual meeting will be held in Los Angeles Nov. 30-Dec. 2 at the Hotel Statler.——At the 12th annual meeting of the **Neurosurgical Society of America**, the following officers were elected: president, Dr. Collin S. MacCarty, Rochester, Minn.; vice-presidents, Drs. Edward B. Schlesinger, New York City, and Thomas J. Holbrook, Huntington, W. Va.; secretary, Dr. Raymond K. Thompson, Baltimore; and treasurer, Dr. Bertram Selverstone, Boston. The next meeting of the society will be held at Del Monte Lodge, Calif., March 30-April 2, 1960.——As of April 24, the new address of the **American Foundation for Tropical Medicine, Inc.**, will be Room 715, 551 Fifth Ave., New York 17; Telephone: MUrray Hill 7-7290.

Conference on Angiology.—As part of the 10th anniversary observance of the founding of the Angiology Research Foundation, a World Conference of Angiology will be held in Atlantic City, N. J., June 5-7, in connection with the fifth annual meeting of the American College of Angiology. Dr. David B. Allman, past-president, American Medical Association, and Brig. Gen. Thomas W. Mattingly, director of medical education, Washington Hospital Center, Washington, D. C., are the honorary co-chairmen of the conference. The cochairmen are Alfred Halpern, Ph.D., president, Angiology Research Foundation, Dr. Paul S. Lowenstein, president, American College of Angiology, and Dr. Saul S. Samuels, editor-in-chief of *Angiology*. Forty-one scientific papers are to be presented by a total of 37 researchers from 10 different countries, including Argentina, Canada, six countries of Europe, and many parts of the United States. Dr. Charles W. Mayo, head of a section on surgery, Mayo Clinic, Rochester, Minn., and chief United States delegate to the World Health Assembly of the United Nations, will be the principal speaker at a reception and banquet Saturday, June 6. The World Conference of Angiology, sponsored by the Angiology Research Foundation, the American College of Angiology and by *Angiology*, is being supported by educational grants from Mead Johnson & Company and the Ortho Research Foundation. All sessions are to be held at the Marlborough-Blenheim Hotel and will be open to all members of the medical profession.

Prevalence of Poliomyelitis.—According to the National Office of Vital Statistics, the following number of reported cases of poliomyelitis occurred in the United States, its territories and possessions in the weeks ended as indicated:

Area	May 2, 1959		May 3 1958
	Paralytic Type	Total Cases	Total
New England States			
Maine	..	..	..
New Hampshire	..	..	..
Vermont	..	..	..
Massachusetts	..	..	..
Rhode Island	..	..	..
Connecticut	..	..	..
Middle Atlantic States			
New York	..	..	1
New Jersey	..	..	..
Pennsylvania	..	..	..
East North Central States			
Ohio	..	1	1
Indiana	..	..	..
Illinois	..	1	..
Michigan	..	1	..
Wisconsin	..	..	1
West North Central States			
Minnesota	..	..	..
Iowa	..	..	2
Missouri	2	2	..
North Dakota	..	..	1
South Dakota	..	..	..
Nebraska	..	..	..
Kansas	..	..	..
South Atlantic States			
Delaware	..	..	..
Maryland	..	..	..
District of Columbia	..	..	..
Virginia	2	2	..
West Virginia	..	1	1
North Carolina	1	1	..
South Carolina	..	..	..
Georgia	..	..	..
Florida	5	6	2
East South Central States			
Kentucky	..	..	1
Tennessee	1	1	..
Alabama	..	..	..
Mississippi	..	..	..
West South Central States			
Arkansas	1	1	..
Louisiana	1	1	..
Oklahoma	..	..	1
Texas	1	3	6
Mountain States			
Montana	..	..	..
Idaho	..	..	..
Wyoming	..	..	..
Colorado	..	..	..
New Mexico	..	1	..
Arizona	..	..	..
Utah	..	..	..
Nevada	..	..	..
Pacific States			
Washington	..	1	..
Oregon	2	2	..
California	4	4	1
Alaska	..	..	..
Hawaii	..	..	..
Puerto Rico	..	..	1
Total	20	29	19

CANADA

Summer School Guest Speakers.—The Vancouver Medical Association Summer School to be conducted June 1-5 at the Stanley Park Pavilion, Vancouver, B. C., will have the following guest speakers:

Dr. Lennox G. Bell, dean, Faculty of Medicine, University of Manitoba; Prof. Hugh McLaren, department of obstetrics and gynaecology, Queen Elizabeth Hospital, Birmingham, England; Dr. George T. Pack, associate professor of clinical surgery, Cornell University School of Medicine, New York City; Dr. Donald R. Smith, clinical professor of urology, University of California School of Medicine, Berkeley-San Francisco; and Dr. Theodore E. Walsh, professor of otolaryngology, Washington University, St. Louis.

CORRECTION

Hyperthyroidism in Infants at Birth.—In the initial answer to the Question and Answer with this title (Feb. 7, page 656) the consultant prepared a section on the mercaptoimidazoles as well as a separate section on the iodinated goitrogens such as iothiouracil sodium. Because of the limitation of space, our consultant was asked to shorten his answer. In the shortening procedure, the drug referring to the first group was left in as an example of the second.

EXAMINATIONS AND LICENSURE

NATIONAL BOARD OF MEDICAL EXAMINERS

National Board of Medical Examiners: Various Centers: Parts I and II, June 16-17; Part I only, Sept. 9-10. Examinations must be received at least six weeks in advance of a specific examination date. Examining centers established after close of registration. Exec. Sec., Dr. John P. Hubbard, 133 South 36th St., Philadelphia 4.

EDUCATIONAL COUNCIL FOR FOREIGN MEDICAL GRADUATES, INC.

Educational Council for Foreign Medical Graduates: Stations around the world, Sept. 22. Final date for filing applications is June 22. Exec. Director, Dr. Dean F. Smiley, 1710 Orrington Ave., Evanston, Ill.

BOARDS OF MEDICAL EXAMINERS

Alabama: *Written.* Montgomery, June 16-18. Sec., Dr. D. G. Gill, State Office Bldg., Montgomery 4.

Alaska:* On application in Anchorage or Fairbanks. Sec., Dr. W. M. Whitehead, 172 South Franklin St., Juneau.

Arizona:* *Reciprocity.* Phoenix, July 15-17. Exec. Sec., Mr. Robert Carpenter, 826 Security Bldg., Phoenix.

Arkansas:* *Examination and Reciprocity.* Little Rock, June 11-12. Sec., Dr. Joe Verser, Harrisburg.

California: *Written.* San Francisco, June 15-18; Los Angeles, Aug. 17-20; Sacramento, October 19-22. *Oral.* San Francisco, June 13; Los Angeles, August 15; San Francisco, November 14. *Oral and Clinical.* San Francisco, June 14; Los Angeles, August 16; San Francisco, Nov. 15. Sec., Dr. Louis E. Jones, Room 536, 1020 N Street, Sacramento.

Colorado:* *Examination.* Denver, June 9-10. *Reciprocity.* Denver, July 14. Sec., Dr. John B. Farley, 712 Republic Bldg., Denver 2.

Connecticut:* *Homeopathic Board. Reciprocity.* Derby, June 9. Sec., Dr. Donald A. Davis, 38 Elizabeth St., Derby. *Regular Board. Examination.* Hartford, July 14-16. Sec., Dr. Staley B. Weld, 160 St. Ronan St., New Haven.

Delaware: *Examination.* Dover, July 14-16. *Endorsement.* Dover, July 23. Sec., Dr. Joseph S. McDaniel, Professional Bldg., Dover.

District of Columbia:* *Written.* Washington, June 8-9. Final date for filing application is May 1. Mr. Paul Foley, Deputy Director, 1740 Massachusetts Ave., N. W., Washington.

Florida:* *Examination.* Miami Beach, June 21-23. Sec., Dr. Homer L. Pearson, 901 N.W. 17th St., Miami 36.

Georgia: *Examination and Reciprocity.* Atlanta, June 10-11. Sec., Mr. C. L. Clifton, 224 State Capitol, Atlanta 3.

Guam: *Subject to Call.* Act. Sec., Dr. F. L. Conklin, Agana.

Hawaii: *Written.* Honolulu, July 13-14. Sec., Dr. I. L. Tilden, 1020 Kapiolani St., Honolulu.

Idaho: *Examination and Endorsement.* Boise, July 13. Exec. Sec., Mr. Armand L. Bird, 364 Sonna Bldg., Boise.

Illinois: *Examination.* Chicago, July 7-10. *Reciprocity.* Chicago, July 10. Supt. of Registration, Mr. Frederic B. Selcke, Capitol Building, Springfield.

Indiana: *Examination.* Indianapolis, June 17-19. Exec. Sec., Miss Ruth V. Kirk, 538 K. of P. Bldg., Indianapolis.

Iowa:* *Examination.* Iowa City, June 15-17. Exec. Sec., Mr. Ronald V. Saf, State Office Bldg., Des Moines 19.

Kansas:* *Examination and Endorsement.* Kansas City, June. Sec., Dr. F. J. Nash, New Brotherhood Bldg., Kansas City.

Kentucky: *Examination.* Louisville, June 8-10. Sec., Dr. Russell E. Teague, 620 South Third St., Louisville 2.

Louisiana: *Examination. and Reciprocity.* New Orleans, June 4-6. Sec., Dr. Edwin H. Lawson, 930 Hibernia Bank Bldg., New Orleans.

Maine: *Examination and Reciprocity.* Augusta, July 14-16. Sec., Dr. Stephen A. Cobb, Sanford.

Maryland: *Examination.* Baltimore, June 10-13. Sec., Dr. Frank K. Morris, 1211 Cathedral St., Baltimore 1.

Michigan:* *Examination.* Ann Arbor and Detroit, June 8-10. Sec., Dr. E. C. Swanson, 118 Stevens T. Mason Bldg., West Michigan Ave., Lansing 8.

Mississippi: *Examination and Reciprocity.* Jackson, June 22-24. Sec., Dr. A. L. Gray, Old Capitol, Jackson 13.

Missouri: *Examination.* St. Louis, May 29-30. Exac. Sec., Mr. John A. Hailey, Box 4, State Capitol Bldg., Jefferson City.

Montana: *Examination and Reciprocity.* Helena, Oct. 6. Sec., Dr. Thomas L. Hawkins, 555 Fuller Ave., Helena.

Nebraska:* *Examination.* Omaha, June 15-17. Director, Mr. Husted K. Watson, Room 1009, State Capitol Bldg., Lincoln 9.

Nevada: *Examination and Reciprocity.* Reno, June 2. Sec., Dr. George H. Ross, 112 North Curry St., Carson City.

New Hampshire: *Examination and Reciprocity.* Concord, Sept. 9-12. Sec., Dr. Edward W. Colby, 107 State House, Concord.

New Jersey: *Examination.* Trenton, June 16-18. Sec., Dr. Royal A. Schaaf, 28 West State St., Trenton 8.

New York: *Examination.* New York, Rochester, Syracuse, Buffalo and Albany, June 23-26. Sec., Dr. Stiles D. Ezell, 23 S. Pearl St., Albany.

North Carolina: *Written. Examination and Endorsement.* Raleigh, June 15-18. Sec., Dr. Joseph J. Combs, 716 Professional Bldg., Raleigh.

North Dakota: *Examination and Reciprocity.* Grand Forks, July 8-11. Sec., Dr. C. J. Glaspel, Box 228, Grafton.

Ohio: *Examination.* Columbus, June 18-20. Sec., Dr. H. M. Platter, 21 West Broad St., Columbus 15.

Oklahoma:* *Examination.* Oklahoma City, June 2-3. Exec. Sec., Mrs. E. L. Haidek, 813 Braniff Bldg., Oklahoma City.

Oregon:* *Examination.* Portland, July 7-9. *Reciprocity and Endorsement.* Portland, July 9-11. Exec. Sec., Mr. Howard I. Bobbitt, 609 Failing Bldg., Portland.

Pennsylvania: *Examination and Endorsement.* Philadelphia and Pittsburgh, July 1-3. Sec., Mrs. Margaret G. Steiner, Box 911 Harrisburg.

GOVERNMENT SERVICES

NAVY

Personal.—Capt. Lynn S. Beals Jr., M. C., United States Navy, was placed on the retired list on April 1, after completing more than 20 years of active naval service.——Rear Adm. Irwin L. V. Norman, M. C., U. S. Navy, was placed on the retired list of officers of the U. S. Navy on May 1. He had served in the Bureau of Medicine and Surgery, Navy Department, since February, 1955; he has been Assistant Chief of the Bureau for Personnel and Professional Operations and Inspector General of Medical Department Activities, taking over the latter duties in March, 1958. On retiring he had more than 31 years of active naval service.

VETERANS ADMINISTRATION

Research in Aging.—A forward look at medical research of the future to prolong health and happiness for the aging population is available in a booklet entitled "VA Prospectus, Research in Aging," a compilation of material from a meeting of the VA Advisory Committee on Problems of Aging, distinguished guests, and VA Department of Medicine and Surgery staff members. The book is divided into five presentations, each followed by discussion: (1) Aging of Molecules—Aging and Ground Substance of Connective Tissue, by Isidore Gersh, Ph.D., Department of Anatomy, University of Chicago School of Medicine, (2) Aging of Cells, by Robert J. Boucek, M.D., Department of Cardiovascular Disease, University of Miami School of Medicine, (3) Aging of Organs—Aging and the Nervous System, by James E. Birren, M.D., chief of the Section on Aging of the National Institute of Mental Health, (4) Aging of Individuals—Some Fundamental Aspects of the Aging Process, by Charles F. Geschickter, M.D., Department of Pathology, Georgetown University School of Medicine, and (5) Aging of Groups, by Jack Weinberg, M.D., attending psychiatrist at Michael Reese Hospital, Chicago. A summary of the conference, by Wilburt C. Davison, M.D., dean of the Duke University School of Medicine, is also included.

Athol Gordon, M.D., William S. Middleton, M.D., John B. Barnwell, M.D., Martin M. Cummings, M.D., Charles C. Chapple, M.D., Joseph Bernsohn, Ph.D., Lee D. Cady, M.D., Neal W. Coppinger, Ph.D., Charles E. Hogancamp, M.D., Kung-Ying Tang Kao, M.D., Ph.D., Thomas H. McGavack, M.D., Stewart G. Tuttle, M.D., John A. Ward, M.D., and others also participated. Dr. Charles C. Chapple is the editor. Copies are available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at a price of $1.50 each.

PUBLIC HEALTH SERVICE

Air Pollution.—The complete proceedings of the National Conference on Air Pollution which was held in Washington in November have been published in book form. The 526-page volume includes the full texts of all the talks plus reports of discussions. The report covers the entire air pollution field—extent, sources, health effects, economic and social effects, control methods, and administrative aspects. It is identified as Public Health Service Publication 654 and is available at $1.75 from the Superintendent of Public Documents, U. S. Government Printing Office, Washington 25, D. C.

FOOD AND DRUG ADMINISTRATION

Color Used in Lipstick.—Seventeen coal-tar colors would be removed from the approved list for unrestricted use in drugs and cosmetics under a proposed order because they cannot be certified as harmless for use in products which in normal use may enter the digestive system. Under the proposed action, these colors could not be used in lipsticks, and the variety of shades now available would be decreased appreciably until cosmetic manufacturers find new ways of reproducing these shades. Seven of these 17 colors caused definite injury to laboratory animals when fed in amounts making up 0.25 to 2.0% of the diet. The other 10 are closely related in their chemical structure to these seven.

There have as yet been no reports of injury to users of lipstick, drugs, or foods made with these coal-tar derivatives. Although the amounts of these colors that get into the digestive system are smaller than those used in Food and Drug Administration (FDA) tests, under the law as interpreted by the Supreme Court the FDA cannot set the amounts of coal-tar colors to be used in foods, drugs, and cosmetics and, accordingly, cannot certify to the safety of colors for unrestricted use unless they are completely harmless. The FDA will not only stop certifying new batches for internal use, but will also stop the use of any stock outstanding. Interested persons are allowed 30 days after publication of these proposals in the federal register to make written comments. These comments will be taken into account by the commissioner of food and drugs in the drafting of an order.

DEATHS

Areson, William Henry Ⓜ De Soto City, Fla.; Columbia University College of Physicians and Surgeons, New York City, 1896; veteran of World War I; fellow of the American College of Surgeons; formerly practiced in Upper Montclair, N. J., and served as president of the Essex County Medical Society; for many years director of board of health of Montclair, N. J., where he was president of the staff of the Mountainside Hospital; died in Arcadia March 7, aged 84.

Arrasmith, Thomas Milton Jr. Ⓜ Richmond, Va.; Jefferson Medical College of Philadelphia, 1924; retired from the regular U. S. Navy on June 30, 1956; veteran of World War II; chief of the bureau of medical aid of the city department of public health; died in St. Luke's Hospital March 5, aged 59.

Barksdale, George Edward Ⓜ Fletcher, N. C.; University College of Medicine, Richmond, 1899; veteran of World War I; died March 6, aged 89.

Becker, Israel Ⓜ Chicago; Dalhousie University Faculty of Medicine, Montreal, Que., Canada, 1927; served on the faculty of the Chicago Medical School; on the staffs of the Franklin Boulevard Hospital, Mount Sinai Hospital, and the Louis A. Weiss Memorial Hospital, where he died March 10, aged 59.

Blackford, Harry Ⓜ Seattle; University of Oregon Medical School, Portland, 1914; veteran of World War I; died in the Swedish Hospital Feb. 23, aged 74.

Boor, Seymour Carl, Creston, Ohio; University of Wooster Medical Department, Cleveland, 1898; served on the staff of the Wooster (Ohio) Community Hospital; died Feb. 16, aged 90.

Cook, Robert Milton, Boones Mill, Va.; Medical College of Virginia, Richmond, 1954; on the staff of the Franklin Memorial Hospital in Rockymount; died in Roanoke Feb. 27, aged 32.

Couche, James Buxton, San Diego, Calif.; University of Toronto Faculty of Medicine, Toronto, Ontario, Canada, 1899; veteran of World War I; died in the Scripps Metabolic Clinic in La Jolla Feb. 16, aged 88.

Cummings, Damon Ward Ⓜ Kansas City, Mo.; University of Louisville (Ky.) School of Medicine, 1928; veteran of World War II; on the staff of the Veterans Administration Hospital; died Feb. 28, aged 59.

Drake, Arthur Knowlton Ⓜ Toulon, Ill.; Harvard Medical School, Boston, 1898; served as superintendent of the Elmgrove Sanatorium in Bushnell; at one time associated with the State Infirmary in Tewksbury, Mass.; died in the Methodist Hospital in Peoria, Feb. 20, aged 86.

Edison, Earl Maynard Ⓜ San Marino, Calif.; Northwestern University Medical School, Chicago, 1937; member of the American Academy of General Practice; veteran of World War II; died Feb. 20, aged 49.

Eells, Joseph Oliver, West Palm Beach, Fla.; Tufts College Medical School, Boston, 1901; died Feb. 25, aged 82.

Ellerbrook, George Edward, Vevay, Ind.; University of Louisville (Ky.) School of Medicine, 1932; coroner of Switzerland County; on the staff of the King's Daughters' Hospital in Madison; died Feb. 25, aged 51.

Ellyson, Charles Wright Ⓜ Waterloo, Iowa; State University of Iowa College of Medicine, Iowa City, 1905; fellow of the American College of Surgeons and the International College of Surgeons; served as president of the Waterloo Medical Society; treasurer of the Black Hawk County Medical Society from 1920 to 1929; for 10 years councilor of the Sixth District of the Iowa State Medical Society; associated with the Allen Memorial, Schoitz Memorial, and St. Francis hospitals; died March 1, aged 81, of coronary occlusion.

Fatherree, John Pleasant Ⓜ Laurel, Miss.; Tulane University School of Medicine, New Orleans, 1939; member of the Southeastern Surgical Congress; fellow of the International College of Surgeons and the American College of Surgeons; medical director and superintendent of the South Mississippi Charity Hospital; on the staff of the Jones County Community Hospital; died Feb. 22, aged 51.

Finch, Frederic Arlington, Amagansett, N. Y.; Baltimore University School of Medicine, 1899; retired coroner of Suffolk County; on the staff of the Southampton (N. Y.) Hospital; died Feb. 12, aged 82.

Fredrickson, Gereon Ⓜ Iron Mountain, Mich.; Chicago College of Medicine and Surgery, 1917; veteran of World War I; served as mayor of Iron Mountain; member of the board of education; physician for Iron Mountain schools and served as director of the Dickinson County Health Department; died in the Veterans Administration Hospital Feb. 22, aged 64.

Ⓜ Indicates Member of the American Medical Association.

Goldstein, Leon Aaron Ⓜ Syracuse, N. Y.; Syracuse University College of Medicine, 1928; member of the American Academy of General Practice; veteran of World War II; on the staff of the Crouse-Irving Hospital; died in St. Petersburg, Fla., Feb. 18, aged 55.

Gormley, John Harry Ⓜ Winnetka, Ill.; Northwestern University Medical School, Chicago, 1927; died March 12, aged 58.

Gould, George Richard Ⓜ Conrad, Iowa; State University of Iowa College of Medicine, Iowa City, 1916; past-member of the school board; veteran of World War I; for eight years member of the hospital board, Grundy County Memorial Hospital in Grundy Center, where he died Feb. 18, aged 72.

Havens, Frederick Morgan Ⓜ Niagara Falls, N. Y.; University of Buffalo School of Medicine, 1933; member of the American Society of Anesthesiologists; served a residency in anesthesia at Bellevue Hospital in New York City; veteran of World War II; on the staffs of the Memorial and St. Mary's hospitals; died Feb. 27, aged 49.

Hennings, Albert Ernest Ⓜ Tuttle, Okla.; St. Louis College of Physicians and Surgeons, 1907; died in the Wesley Hospital, Oklahoma City, Feb. 28, aged 80.

Horkins, Harold Albert Ⓜ Detroit; University of Toronto Faculty of Medicine, Toronto, Ont., Canada, 1928; certified by the National Board of Medical Examiners; associated with St. Mary's and Holy Cross hospitals; died Jan. 11, aged 56.

Jeans, Howard Stafford Ⓜ Lynwood, Calif.; George Washington University School of Medicine, Washington, D. C., 1943; member of the American Academy of General Practice; veteran of World War II; on the staff of St. Francis Hospital, where he died Feb. 25, aged 41.

Johnston, Crowell William Ⓜ West Palm Beach, Fla.; University of Georgia Medical Department, Augusta, 1899; died Feb. 24, aged 83.

Keating, *Peter McCall*, *Philadelphia; born in* Atlantic City, N. J., July 21, 1884; University of Pennsylvania Department of Medicine, Philadelphia, 1910; served on the faculty of his alma mater; specialist certified by the American Board of Orthopaedic Surgery; served as an observer in the U. S. Army attached to the French Army in 1915-1916 and was decorated by the French government; veteran of World Wars I and II; fellow of the American Academy of Orthopaedic Surgery, Philadelphia Surgical Society, and the Texas Surgical Society; member and past-president of the Texas Orthopaedic Association, of which he was founder; associated with the Bryn Mawr (Pa.) Hospital, Pennsylvania Hospital, and the Misericordia Hospital; served on the staffs of the Robert B. Green, Santa Rosa, and Nix Memorial hospitals in San Antonio, Texas; formerly medical director of the Gonzales Warm Springs Foundation Hospital for Crippled Children in Gonzales, Texas; died in the Hospital of the University of Pennsylvania Feb. 20, aged 74.

Kretsch, Russell Woodling Ⓜ Hammond, Ind.; Indiana University School of Medicine, Indianapolis, 1925; veteran of World War I; member of the staff of St. Margaret Hospital; died Feb. 23, aged 61.

LaForge, Alvin Wilfred, Austin, Texas; the Hahnemann Medical College and Hospital, Chicago, 1911; veteran of World War I; died Feb. 21, aged 70.

Leasum, Robert Nels Ⓜ Osseo, Wis.; Jefferson Medical College of Philadelphia, 1918; veteran of World War I; on the staffs of the Sacred Heart Hospital and Luther Hospital in Eau Claire, where he died Feb. 27, aged 67.

Leyda, Paul Leighton Jr., Denver; University of Colorado School of Medicine, Denver, 1946; interned at Highland-Alameda County Hospital in Oakland, Calif.; served a residency at the St. Francis Hospital and Sanatorium in Colorado Springs, Colo., and the Veterans Administration Hospital in Denver; specialist certified by the American Board of Surgery; member of the Industrial Medical Association; captain, medical corps, U. S. Army Reserve from 1947 to 1949; formerly associated with the Lanai Community Hospital in Lanai City, Hawaii; died Feb. 24, aged 36.

Manahan, Charles Albert, Vinton, Iowa; State University of Iowa College of Homeopathic Medicine, Iowa City, 1908; Jefferson Medical College of Philadelphia, 1909; veteran of World War I; on the staff of the Virginia Gay Hospital; died Feb. 25, aged 73.

Markoff, Samuel Tobias Ⓜ Brooklyn; Yale University School of Medicine, New Haven, Conn., 1926; member of the American Academy of General Practice; on the staff of the Brooklyn Women's Hospital; died March 6, aged 56.

Matthews, Augustus Douglas Ⓜ Ozark, Ala.; University of Alabama School of Medicine, Mobile, 1911; served as a member and chairman of the Dale County Board of Education; died Feb. 20, aged 72.

McConnell, Joseph Horton Ⓜ Galveston, Texas; University of Texas School of Medicine, Galveston, 1956; also held a degree in law; veteran of World War II and the Korean War; retired captain in the Air Force; died Feb. 24, aged 37.

McCrary, Dowell Womack, Stevenson, Ala.; Memphis (Tenn.) Hospital Medical College, 1913; died in the Jackson County Hospital, Scottsboro, Feb. 23, aged 73.

Natt, Jerome Ⓜ Roanoke, Va.; Long Island College of Medicine, Brooklyn, 1933; member of the American Academy of General Practice; past-president of the Roanoke Council for Retarded Children; died Feb. 22, aged 51.

Nutter, Edwin Hughes Ⓜ Newark, Del.; Hahnemann Medical College and Hospital of Philadelphia, 1935; interned at Homeopathic Hospital in Wilmington; member of the American Academy of General Practice; associated with the Memorial Hospital in Wilmington, where he died Feb. 24, aged 51.

O'Donnell, Reynolds Joseph Ⓜ Santa Monica, Calif.; Creighton University School of Medicine, Omaha, 1929; served on the faculty of his alma mater; veteran of World War II; vice-chief of staff, secretary and treasurer of the St. John's Hospital; member of the staff of Santa Monica Hospital; past-president of the Catholic Physicians' Guild of Greater Los Angeles and a past-president of the Creighton University Alumni Association of Southern California; died Dec. 11, aged 57.

Parker, Oliver T. Ⓜ Salida, Colo.; University Medical College of Kansas City, Mo., 1897; served on the staff of the Denver and Rio Grande Western Hospital; died Feb. 22, aged 82.

Paulson, Alvin Winfred Ⓜ Oklahoma City, Okla.; Washington University School of Medicine, St. Louis, 1932; veteran of World War II; associated with the University and Children's hospitals, and head of the outpatient department of Veterans Administration Hospital, where he died March 7, aged 51.

Peck, Anna Dixon, Oakland, Calif.; Cooper Medical College, San Francisco, 1900; served as superintendent of schools in Napa County; for many years associated with the U. S. Veterans Bureau in Washington, D. C.; died Feb. 26, aged 90.

Peck, Willena Abby Ⓜ Stow, Mass.; Woman's Medical College of Baltimore, 1900; at one time associated with the Blue Mountain (Miss.) College and the Alabama College in Montevallo, where she received an honorary doctor of laws degree; died in the Emerson Hospital, Concord, Feb. 27, aged 84.

Rininger, Harold Casper Ⓜ Evansville, Ind.; Indiana University School of Medicine, Indianapolis, 1930; veteran of World War II; on the staffs of the St. Mary's and the Welborn Memorial Baptist hospitals; died in the Barnes Hospital, St. Louis, Feb. 28, aged 52.

Riter, James Foster, Bryson City, N. C.; Jefferson Medical College of Philadelphia, 1904; veteran of the Spanish-American War; died Feb. 19, aged 80.

Roark, Walter William Ⓜ Bethpage, Tenn.; University of Tennessee College of Medicine, Memphis, 1912; died Feb. 19, aged 86.

Rogers, William Hershel, Blairsville, Ga.; Medico-Chirurgical College of Philadelphia, 1901; died Feb. 23, aged 88.

Rowat, Harry Lewis Ⓜ Des Moines, Iowa; State University of Iowa College of Homeopathic Medicine, Iowa City, 1904; died Feb. 17, aged 80.

Schenck, Sam Moore Ⓜ Shelby, N. C.; University of Pennsylvania School of Medicine, Philadelphia, 1923; fellow of the American College of Surgeons; on the staff of the Cleveland County Hospitals; died in Manteo, N. C., Feb. 10, aged 63.

Scott, Ira Benjamin, Cleveland; Meharry Medical College, Nashville, Tenn., 1923; died in the Polyclinic Hospital Feb. 4, aged 69.

Stott, Ardenne Albert Ⓜ Bath, Maine; Tufts College Medical School, Boston, 1907; fellow of the American College of Surgeons; veteran of World Wars I and II; member of the staff of the Bath Memorial Hospital; died in the Maine Medical Center, Portland, Feb. 9, aged 75.

Straeten, Renier John Ⓜ Commander, U. S. Navy, retired, Los Angeles; John A. Creighton Medical College, Omaha, 1905; entered the U. S. Navy in 1907 and retired June 30, 1936; died Dec. 19, aged 74.

Taitz, Irvin Solomon Ⓜ Pittsburgh; Universität Basel Medizinische Fakultät, Switzerland, 1937; served on the staff of the Columbia Hospital in Wilkinsburg, Pa.; died in the Montefiore Hospital March 4, aged 48.

Vandever, Harl Fitzgerrell Ⓜ Enid, Okla.; University Medical College of Kansas City, Mo., 1907; veteran of World War I; medical director of the Enid State School; associated with the Enid General Hospital, where he died March 7, aged 74.

Wilson, Morris Wulfson Ⓜ Oak Park, Mich.; Universität Basel Medizinische Fakultät, Switzerland, 1936; served a residency in pathology at the Children's Hospital in Washington, D. C., and the Colorado State Hospital in Pueblo; specialist certified by the American Board of Pathology; member of the College of American Pathologists and the American Society of Clinical Pathologists; association with the U. S. Public Health Service terminated Sept. 29, 1946; served on the staff of the Veterans Administration Center at Mountain Home, Tenn.; died Jan. 16, aged 46.

Wolf, Morris Ⓜ Brooklyn; Long Island College Hospital, Brooklyn, 1921; died in the Long Island College Hospital Dec. 29, aged 70.

Zarbaugh, Guy Frederic Ⓜ Deadwood, S. D.; University of Nebraska College of Medicine, Omaha, 1925; veteran of World Wars I and II; died Feb. 27, aged 61.

FOREIGN LETTERS

GERMANY

Preventing Senility.—C. Hackmann (*München. med. Wchnschr.* 100:1814-1817, 1958) gave small doses of 2-(*p*-aminobenzenesulfonamide)-pyrimidine and 2-(*p*-aminobenzenesulfonamide)-methylpyrimidine to young rats. After several months he observed an improvement of the coat, increase in body weight, and a distinct improvement in the general condition, in contrast to control animals given tetracycline, chloramphenicol, and similar drugs. In all cases the treated animals lived longer than the controls. The author then repeated the experiment with old rats, and again he noticed a distinct improvement of the coat and general condition and a prolonged life, if the animals were treated for a sufficiently long time. The same results were obtained in mice. These effects were independent of the sex of the animal. The efficacy of the drugs was neutralized by simultaneously giving PABA.

In the same issue H. Hackmann and C. Hackmann reported the use of these drugs on 14 patients suffering from senile cataract. In 12 patients subjective and objective improvement of vision and in some striking improvement of the general condition were achieved. Side-effects or alteration of the blood chemistry did not occur.

INDIA

Long-Acting Sulfonamide.—K. J. Vyas treated 54 children suffering mostly from gastrointestinal and respiratory infections with sulfamethoxvpyridazine. This compound is believed to be rapidly absorbed from the gastrointestinal tract, producing a high blood concentration within a short time which is maintained for a long time. Its degree of acetylation is low, solubility in urine low, and urinary excretion slow. Its antibacterial activity is equal to that of sulfadiazine. It was given in the form of a syrup in a single daily dose of 0.5 to 1.0 Gm. every morning. No other antibacterial agent was used. An alkaline mixture was given along with it, and the duration of treatment varied from 2 to 28 days, although it was given to most patients for less than a week.

In this series 44 patients were cured, 5 had marked relief, 2 had moderate relief, and 3 were not benefited; of these 2 had infectious diarrhea, and the 3rd had chronic otitis media with chronic upper respiratory tract infection. Side-effects were met with in only three and consisted of nausea and vomiting. Most patients responded well within five days of treatment. It was observed that in patients with bronchitis the cough was the last symptom to disappear, persisting long after the acute symptoms had disappeared. Chronic otitis media was slow to respond or did not respond at all, and in seven patients with respiratory infections the tonsils remained enlarged at the end of treatment. The drug was on the whole well tolerated and easily accepted by the children.

ITALY

Vitamin D_2.—L. Papadia of the Orthopedic Clinic of Florence (*Archivio Putti*, vol. 10, 1958) studied the action of large doses of chemically pure, orally administered vitamin D_2 on the muscles of growing rats in an effort to determine how much of the change described in the skeletal muscles after administration of large amounts of cod liver oil is due to its vitamin D_2 content and how much is due to a secondary action of the oil (caused by the ease with which it turns rancid), through destruction of the vitamin E content of the diet. The amount of vitamin D_2 administered was 2 mg. per day. The duration of treatment was two, four, six, or eight weeks. In all subjects changes in muscles were found, but while the animals treated for a shorter time showed reduction of the caliber of the fibers and a crowding together of the nuclei, those treated for a longer time showed more widespread degeneration. The changes observed were similar to those previously described after the use of cod liver oil. The author concluded that vitamin D_2 given in large amounts is capable by itself of producing marked alterations in muscles.

NORWAY

Mass Radiography.—Hansen and Riddervold (*Nord. med.* 61:169-174 [Jan. 29] 1959) stated that from 1943, when it was established, until the end of 1957 the mass-radiography service has made over 4,100,000 x-ray examinations of the population over 14 years of age. Each year radiograms of about 350,000 persons are taken by means of seven units, two of which are installed on boats. Since 1948 the mass radiography has been combined with tuberculin testing and BCG inoculation. The authorities concerned were empowered to summon people to

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The items in these letters are contributed by regular correspondents in the various foreign countries.

these examinations. The films were read at a central office in Oslo with independent readings, since 1952, by two specialists and a control reading by a third who reexamined the films of those persons who by one or both of the first readers had been referred for follow-up examinations. Mass radiography was used most extensively in areas where there was a high incidence of tuberculosis. Of the 20 provinces in Norway 14 had been covered by mass radiography twice, 3 three times, and 1 five times. Attendance of the native population was between 72 and 84% for men and between 80 and 91% for women in the years 1949 to 1957.

In the years 1949 to 1953 between 2.8 and 4.2% of the persons examined were referred for follow-up examination. The follow-up study showed that 1.3 to 1.5 persons per 1,000 had tuberculosis, previously unrecognized in 0.07 to 0.12%. There was good correlation between the mortality from tuberculosis in each province and the incidence of new cases of active tuberculosis found. The number of infectious cases of tuberculosis was more than twice as high for men as for women in the older age groups. A corresponding difference was not found for other tuberculous changes in the lungs. Duplicate readings in 1953 of about 267,000 miniature films distributed among 29 readers showed a variation in the frequency of referrals of from 3.1 to 12.1%. The difference was essentially due to subjective factors. With unanimous reading by three specialists the incidence of infectious cases discovered by follow-up was 7.1%, with divergence among the readers of 0.8%.

SWEDEN

Convulsions in Childhood.—At the Kronprinsessan Lovisas Barnsjukhus children's hospital between 10 and 14% of the admissions from 1952 to 1956 were for convulsions. According to Dr. C. Gyllenswärd (*Svenska läkartidningen*, Feb. 6, 1959) they occur at least once in about 7% of all children under the age of 15 years. To distinguish among the 15 possible causes of a convulsion in childhood it is necessary to take the child to a hospital with a team specializing in neurology, psychiatry, radiology, surgery, physiology, and biochemistry. The author is opposed to the isolation of epileptic children in special classes. His hospital keeps in touch with some 500 children who have suffered from convulsions, and he believes that about 80% of such patients recover completely. With the drugs now available 90% of all epileptic children can be kept free of attacks, and of the remaining 10% most can achieve an appreciable reduction of their frequency. From both the medical and the scholastic points of view, most epileptic children should attend the same classes as normal children. To refer them to special schools or mix them with adult epileptics is cruel.

UNITED KINGDOM

Patent Medicines on Television.—The *British Medical Journal* of March 21 says in an annotation that anything that forces itself on the attention is apt to stir up mixed feelings. When advertisements fill the breaks between and within television programs, they find a captive audience that may be anything from inert to spellbound but is probably not highly critical. It is therefore reassuring to see that the opening words of the Independent Television Authority's principles of advertising state the general principle that it should be "legal, clean, and truthful." Clearly these are admirable precepts, and if they do not exclude the possibility of the advertisements also being nonsense, they are at least intended to prevent the use of half-truths.

In order to help the Authority maintain proper standards it has an advertisements committee, on which the BMA has an experienced representative in Dr. H. G. Dain. According to the assistant postmaster-general, who recently replied to some parliamentary questions on the subject: "All advertisements and claims for these proprietary drugs are considered by the committee and would not be approved if they were wildly extravagant." Control is thus exercised over the advertisement of medicaments on television, and the criteria relating specifically to medical products are set out in the British Code of Standards, which apply to all advertising to the general public. Their more important provisions may be paraphrased as follows:

No advertisement should (1) contain a claim to cure, (2) offer a product or advice relating to a disease for which the patient should rightly receive the attention of a physician, (3) appeal through fear, (4) offer diagnosis or treatment by correspondence, (5) claim that the product could promote virility or prevent premature aging, (6) offer any medicinal product for the purposes of slimming, weight reduction, or figure control, or (7) offer diagnosis or treatment by hypnosis.

In addition, special limitations are imposed on products advertised for the treatment of baldness and hemorrhoids. It is also an offense to advertise a product, outside of technical journals, as a remedy for cancer, tuberculosis, epilepsy, nephritis, cataract, glaucoma, diabetes, locomotor ataxia, paralysis, and venereal diseases, nor may any product be advertised in terms calculated to lead to its use for producing a miscarriage. Television attracts large sums of money for the advertisement of drugs. Much the largest group is aspirin and headache remedies followed by indigestion remedies, laxatives, and cough and cold remedies.

CORRESPONDENCE

DIABETES AND PREGNANCY

To the Editor:—The editorial in The Journal, Jan. 17, page 258, entitled "Diabetes and Pregnancy" contains the following statement: "A diet for a diabetic-obstetric patient should be given, averaging 30 calories per kilogram of increasing body weight and containing 175 to 250 Gm. of carbohydrate, 2 Gm. of protein per kilogram of body weight, and a sufficient amount of fat to complete the diet." The question concerning protein requirement of the pregnant diabetic merits discussion.

A patient who is in caloric equilibrium requires from 0.5 to 0.7 Gm. of protein per kilogram of body weight to maintain nitrogen equilibrium. The protein must be in a readily assimilable form and must contain the essential amino acids in adequate amounts. To provide an increased margin of safety, it is customary to give 1 Gm. of protein per kilogram of body weight per day. The author of the editorial proposes a protein intake of 2 Gm. per kilogram per day in pregnant diabetics. This, in a patient weighing 60 kg. (132 lb.), would, over a nine-month period, result in an intake of 16 kg. (36 lb.) of protein in excess of the amount necessary to maintain nitrogen equilibrium in a normal person. Is this large amount of protein necessary?

The fetus at term contains 630 Gm. (1.4 lb.) of protein (100 Gm. of nitrogen). The weight of the uterus, which normally is 30 Gm., increases to 1 kg. (2.2 lb.) at term. Since 75% of the uterine muscle is water, the protein increment is only 225 Gm. (0.5 lb.). The total increment of protein in the patient, resulting from the growth of the fetus and enlargement of the uterus, is barely 900 Gm. (2 lb.) There is some retention of protein by the patient, but from the teleologic standpoint, this is not at all essential. An important point is that the growth of the uterus and fetus during the first five months of pregnancy is comparatively negligible. Their combined weight at the end of this period is only 1 kg. in a woman weighing 60 kg. Beginning at the sixth month there is a rapid increase in the rate of growth of the uterus and fetus, which becomes precipitous during the eighth and ninth months.

From the foregoing one may conclude that (1) during the first five months of pregnancy a protein intake of from 1 to 1.2 Gm. per kilogram per day is sufficient and (2) during the last four months of pregnancy an intake of 1.5 Gm. of protein per kilogram of body weight per day will adequately supply the protein needs. Larger amounts of protein may be given but are not essential.

Max Wishnofsky, M.D.
615 Williams Ave.
Brooklyn 7, N. Y.

To the Editor:—Dr. Wishnofsky's points concerning the dietary needs for a diabetic-obstetric patient are well taken. The requirement of protein in the diet of such a patient who has had adequate protein intake before pregnancy is about 1.5 Gm. of protein per kilogram of body weight per day, but larger amounts of protein are given if the patient has not had adequate protein intake to make up for the past deficit. The optimum aim is nearly 2 Gm. of protein per kilogram of body weight to insure that the mother and fetus get sufficient protein and also to prevent possible toxemia. Although the cause of toxemia of pregnancy is conjectural, it is believed by various investigators that a high-protein, well-balanced diet acts as a preventive of toxemia of pregnancy. Many pregnant diabetic women are on a low-protein-intake diet because of the high cost of a high-protein diet. Others find it difficult to ingest 2 Gm. of protein per kilogram of body weight per day. A good nutritionist can be of aid in this connection.

Harry Blotner, M.D.
314 Commonwealth Ave.
Boston 15.

DATA ON BLOOD DONORS WANTED

To the Editor:—I am interested in securing blood samples from donors who are suspected of being carriers of viral hepatitis. In our laboratory, we wish to run a battery of liver function tests on these samples and hope to obtain more information on the number of suspected carriers who show abnormal results in these tests. We wish to study donors whose recipients have acquired viral hepatitis after transfusion, but only in those cases in which a single transfusion was given. Thus, we are interested only in so-called single donors. Drs. John Neefe and John G. Reinhold and I, with a number of our younger associates, have been interested in the problem of rejecting donors for transfusion who are potential carriers of viral hepatitis. Two of our papers were published in The Journal, one in the March 27, 1954, issue and one in the March 31, 1956, issue. Physicians knowing of cases of viral hepatitis occurring after a single transfusion are requested to write me for more precise information on submitting a serum specimen and clinical data on the blood donor for our evaluation.

Robert F. Norris, M.D.
University of Pennsylvania
Pepper Laboratory of Clinical Medicine
Philadelphia 4.

MISCELLANY

THE MEDICAL TECHNOLOGIST AND THE DOCTOR

Robert B. Robins, M.D., Camden, Ark.

As a practicing physician I have an interest in the work of medical technologists and the other professional and technical personnel who assist me and my colleagues in daily practice. I know from experience how important their services are to the teamwork necessary for modern medical care.

As a member of the Board of Trustees of the American Medical Association I also have an interest from the organizational point of view. The A. M. A. has an important committee now studying all phases of the problem of promoting cooperation and rapport between the medical profession and persons in the so-called paramedical areas. That committee, in a progress report at the Clinical Meeting in Minneapolis last December, described this as "one of the most complex problems on the American medical scene today." The committee pointed out that more than 60 groups are functioning in the ancillary or paramedical areas.

You gain a perspective on the complexity of this subject by looking at the growth and development which have taken place in the field of medical technology. In the early days of the clinical laboratory the pathologist was just beginning to be recognized as a necessary medical specialist, and he performed his own laboratory tests. As laboratory medicine developed, pathologists found they needed help; so they began to train assistants to perform the simpler tests. The profession of medical technology was born around the time of World War I.

In those early days the few commercial schools that were established offered training that was inadequate, and their fees were sometimes exorbitant. Realizing that laboratory medicine was developing rapidly and that something must be done to standardize the training of laboratory assistants, the American Society of Clinical Pathologists in 1928 established the Registry of Medical Technologists.

This registry has become recognized by leading medical and hospital groups as the only authoritative qualifying body in the field. It has developed the status of the medical laboratory worker to a high professional level by raising the educational requirements and broadening and improving the technical training. The requirements established by the registry are recognized by such medical organizations as the American Medical Association, the American College of Surgeons, the American College of Physicians, the American Hospital Association, the Catholic Hospital Association, and by other pathologists, physicians, and hospital superintendents. Those requirements also are strongly emphasized by the American Society of Medical Technologists in its career guidance publications directed toward young people planning to enter this field.

In their periodic visits to hospitals staff representatives of the American College of Surgeons, the American Hospital Association, and the American Medical Association—who also are field representatives of the Joint Commission on Accreditation of Hospitals—carefully observe whether workers in the clinical laboratories have registry certificates. The registry, therefore, while purely voluntary and noncoercive, is universally accepted as the recognized authority for qualifying medical technologists in the United States.

In the past few years there has been great progress in the development of new laboratory aids to help the doctor in providing the patient with the best medical care, and year by year techniques have become more complex and specialized. To unravel major problems in diagnosis or treatment physicians today frequently seek the help of biochemists, biophysicists, bacteriologists, histochemists, experts in isotope techniques, and others. The doctor, of course, cannot be expected to master all the testing techniques, so he must depend on technicians and pathologists for help.

The entire March, 1959, issue of *Medical Clinics of North America* was devoted to a symposium on the rationale and clinical interpretation of laboratory tests. The subjects covered included practical tests of gastrointestinal function, liver function, pancreatic function, pulmonary function, kidney function, and thyroid function; tests for clotting disorders, leukemia, and diabetes; and other subjects, including a variety of recently developed laboratory procedures.

The field of medical technology, like the medical profession itself, has become so complex that the registry now issues several different types of certificates, in addition to the general certification which has been given for many years. For example, there is the specialist certification, as well as differ-

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Read before the Louisiana State Society of Medical Technologists, Monroe, La., April 17, 1959.

ent kinds of certificates in histological technique, chemistry, microbiology, blood banking, and exfoliative cytology.

Through the years, with all these technical developments unfolding at an accelerated pace, medical technologists have worked constantly to improve their standards and qualifications. They have done this without any kind of governmental compulsion, control, or licensure—national, state, or local. In fact, one of the brightest spots in the entire paramedical picture is the excellent cooperation which has long existed among the American Medical Association, the American Society of Clinical Pathologists, that society's Board of Schools and Board of Registry, and the American Society of Medical Technologists. These groups have worked closely together in establishing and maintaining high standards of education, technical training, and voluntary registration for medical technologists.

You probably know that the A. M. A. Council on Medical Education and Hospitals acts as the inspection and approval agency for schools of medical technology. By November, 1958, the number of approved schools had increased to 688, with an enrollment of more than 3,000 students. The last annual report of the council showed increases in enrollment and number of graduates which were attributed to the effective recruitment program of the National Committee for Careers in Medical Technology. There now are at least 24,000 registered medical technologists, and there are many who are not registered. The needs of the future will require greater and greater effort. Indicative of the trend is the continuing increase in the number of medical technology schools with college or university affiliations. And effective in January, 1962, the entrance requirement for approved schools will be increased from two to three years of pretechnical college education.

These developments mean that all of us will have to intensify our cooperative efforts to recruit young people with an aptitude for this field, to maintain and constantly improve the standards of education and training, and to promote an ever higher proportion of qualified, registered medical technologists.

While this growth and development has been taking place in the field of medical technology the same thing, in varying degrees, has been happening in other paramedical areas. The medical team has grown in both size and diversity. Working for or with physicians in modern medicine are not only nurses, pharmacists, and medical technologists but also x-ray technicians, occupational therapists, physical therapists, psychiatric social workers, medical record librarians, medical record technicians, and many other types of technical personnel. In addition, there is a large group of persons holding advanced degrees, such as the Ph.D., who are engaged in medical and allied teaching. They also participate directly or indirectly in the care of patients. They are especially active in such preclinical fields as anatomy, biochemistry, microbiology, pharmacology, and physiology.

The best estimate so far is that there are 10 paramedical personnel for each physician. You can see that, from the standpoints of both size and diversity, the problem of promoting closer coordination and higher standards is an enormous one.

Earlier I mentioned an A. M. A. committee that is studying all phases of this subject. Creation of this committee by the Board of Trustees of the American Medical Association reflects a sincere desire to improve the quality of medical care in America by bringing together the too often divergent interests that have evolved during the rapid progress in all fields of medical care. There will be concerted effort to develop an atmosphere in which all will work harmoniously in the best interests of the patient.

Continued advances in medical care and in the art and science of medicine will certainly be in direct relation to the medical profession's ability to understand and work cooperatively with the many disciplines that contribute to the total care of the patient. The precise nature of these future cooperative efforts remains to be determined. Our immediate aim is to gain a broad, over-all view of the various disciplines that are closely related to medicine. Later, there will be more detailed study of particular phases and suggested courses of action.

The House of Delegates of the American Medical Association adopted a resolution in December, 1958, encouraging the voluntary registration of paramedical personnel who assist physicians. At the same time it expressed opposition to the extension of governmental licensure and governmental registration. However, the House requested the committee on paramedical areas to expand its study to include this phase of the problem.

Prominent in the medical profession's thinking is the concept of teamwork and the realization that physicians must offer more active leadership and guidance to ancillary groups. Medical technicians are our fellow workers and our allies in reaching the goal of improved patient care. We want to understand their problems, and we want them to understand ours.

MEDICAL LITERATURE ABSTRACTS

INTERNAL MEDICINE

A Syndrome Developing After Myocardial Infarction. H. P. Groeneveld. Nederl. Tijdschr. geneesk. 103:153-154 (Jan. 24) 1959 (In Dutch) [Amsterdam].

In connection with the case history of a 57-year-old man, who was hospitalized with a diagnosis of heart infarct, the author calls attention to the postmyocardial infarction syndrome which was first described by Dressler in THE JOURNAL (160: 1379 [April 21] 1956). The syndrome is characterized by a combination of pleurisy, pericarditis, and sometimes pulmonary infiltration. The patient presented had had diabetes mellitus for 15 years, and for a period of 6 months preceding the myocardial infarction he had had typical anginal attacks. On examination, pericardial as well as pleural friction rubs could be heard. The left side of the heart was enlarged. The electrocardiogram indicated a posterobasal infarct. The pericardial and pleural friction rubs as well as the cardiac enlargement persisted for a considerable period, but the course was favorable. The patient was treated with insulin and anticoagulants, and was discharged from the hospital after 9 weeks. The author feels that the postmyocardial infarction syndrome is not rare, and that it should be thought of, when there are symptoms suggestive of the extension of the heart infarct, cardiac enlargement, and pulmonary infarct. Dressler found prednisone therapeutically effective but did not employ anticoagulants.

The Low-Salt Syndromes in Congestive Heart Failure. A. Vogl. Am. J. Cardiol. 3:192-198 (Feb.) 1959 [New York].

The author summarizes the current concept of the "low-salt syndromes" and their management in patients with congestive heart failure as follows. The low-salt syndrome is not an entity either clinically or biochemically but represents a group of loosely related disorders. The two main types are (1) an acute or subacute form which develops during intensive diuretic treatment and (2) a chronic form which evidently cannot be attributed to excessive diuresis, since the finding of a low concentration of sodium and chloride in the serum can connote either electrolyte loss or water retention. The differentiation between these two states is made largely on clinical grounds. In most patients there is probably a combination of both factors. The principles of management are different for the depletion types (hypochloremic acidosis and hyponatremia) and the dilution types (lowering of the serum sodium concentration due to dilution of the sodium in the extracellular fluid), but in a given patient treatment remains largely empirical and must be guided by clinical as well as laboratory observation. Correction of the altered electrolyte concentrations is more likely to be achieved if treatment is not limited to appropriate administration of sodium and chloride, but includes the restriction of fluid intake and the concurrent administration of potassium.

The iatrogenic production of a "low-salt syndrome" is not an inevitable risk whenever a low-salt diet and potent diuretics are employed. It can, by and large, be avoided if treatment is individualized, and if the effect of the diuretic procedures is critically evaluated from day to day. Practical treatment principles are presented.

Treatment of Hypertension in the Ambulatory Patient. J. H. Moyer and J. Beem. Am. J. Cardiol. 3:199-213 (Feb.) 1959 [New York].

The authors report observations on 129 unselected patients with diastolic hypertension of all grades of severity, who were studied at the hypertension outpatient clinic of the Hahnemann Hospital in Philadelphia. Blood pressure elevation of adequate severity and for a prolonged period of time will definitely produce vascular changes in the brain, the heart, and the kidneys. Effective reduction of blood pressure may completely arrest these vascular changes regardless of the method used for the reduction of blood pressure. Although the changes may be arrested, renal function rarely returns to normal. Hypertension aggravates and hastens the development of arteriosclerosis. Reducing the blood pressure arrests this hastening process, but still arteriosclerosis progresses, just as it does in the normotensive person. The method used for the reduction of blood pressure is prob-

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The place of publication of the periodicals appears in brackets preceding each abstract.

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ably not important, insofar as arresting the vascular changes associated with hypertension is concerned. The important thing is that the blood pressure be reduced effectively. This the surgeon can do, particularly when he employs concurrent medical therapy. The authors would concur with this approach, just as long as the blood pressure is severe enough to warrant surgical therapy and the surgeon is proficient at performing sympathectomies. On the other hand, when the psychiatrist or the general practitioner or the internist, who carries psychiatric overtones, can "talk the blood pressure down," this is to be considered good therapy. The authors, being neither psychiatrists nor surgeons, prefer to use drugs, and their own results with psychotherapy (and placebo) have been poor.

A *multipronged approach is outlined,* based on the severity of the hypertensive disease. Mild hypertension can be controlled with chlorothiazide, given to deplete body sodium by increasing its excretion. The administration of this drug may be continued indefinitely as a background medication for all antihypertensive drugs. This is probably the most effective measure for the reduction of blood pressure. Then the sympathetic nervous system is blocked by various methods. The centrally acting drugs are used first. The commonest ones are rauwolfia and hydralazine. Usually in milder cases rauwolfia may be given an initial trial alone, and if the patient needs additional therapy, he may receive hydralazine (Apresoline). In patients with moderately severe hypertension, hydralazine combined with rauwolfia may be given a therapeutic trial.

For patients with more severe hypertension, when the diastolic blood pressure is fixed above 120 to 130 mm. Hg, the use of glanglionic blocking agents, such as mecamylamine or pentolinium, is indicated. Of 31 patients with malignant hypertension, 13 were treated and 18 were untreated. Seventeen of the latter group have died, while of the treated patients 11 are living and 2 are dead. Eleven of the 18 untreated patients died of renal failure and uremia. Treatment of patients with malignant hypertension has completely altered the cause of death, and, when treatment was started as long as the blood urea nitrogen level was normal, patients rarely died of renal failure. The cause of death in treated patients usually was a cerebrovascular accident or a coronary occlusion.

Digitalis and Atrial Tachycardia with Block: A Year's Experience. B. Lown, F. Marcus and H. D. Levine. New England J. Med. 260:301-309 (Feb. 12) 1959 [Boston].

Although numerous recent reports emphasize the increasing frequency of digitalis poisoning, there is as yet little appreciation of the digitalis-induced atrial arrhythmias, the prototype of which is paroxysmal atrial tachycardia with block. The present report is based upon an examination of episodes of paroxysmal atrial tachycardia with block studied at the time of their occurrence in 1957 at the Peter Bent Brigham Hospital, Boston. Thirty-two episodes of paroxysmal atrial tachycardia with block were diagnosed in 23 patients. The criteria for the diagnosis were as follows: an atrial rate usually between 150 and 200; a demonstrable change in the morphology of the P wave; an isoelectric baseline between consecutive complexes in all leads; and the presence of atrioventricular block, either spontaneous or induced by carotid sinus pressure or other vagal maneuvers. The role of digitalis was established on the basis of the clinical circumstances chronologically *related to the onset and cessation of the arrhythmia.* Digitalis was considered to be the cause (1) if the arrhythmia developed during digitalization or after an increase in maintenance dosage and was abolished by withdrawal of the drug; (2) if the arrhythmia occurred in a digitalized patient immediately after a mercurial-induced diuresis with a substantial weight loss; (3) if the arrhythmia appeared after an event known to enhance digitalis effect, such as potassium loss induced by vomiting, diarrhea, or hemodialysis; (4) if subjective and objective signs of digitalis overdosage appeared with the onset of paroxysmal atrial tachycardia with block and disappeared when the drug was withdrawn.

Twenty-four of the 32 episodes of paroxysmal atrial tachycardia with block were due to digitalis intoxication. In 4 of the 24 episodes simply the discontinuance of digitalis and of diuretic measures restored a normal mechanism. In 2, the administration of digitalis was continued; both patients died. In the remaining 18, measures in addition to stopping digitalis were required: Five episodes were controlled by the oral or intravenous use of potassium; in 10 reversion was achieved by the combined use of potassium and procainamide; and 3 were controlled by procainamide alone. It appears mandatory to stop digitalis and suspend the use of diuretics until a normal mechanism is established. During the past 5 years there has been no reduction in the incidence of paroxysmal atrial tachycardia with block at the Peter Bent Brigham Hospital. The continuing high incidence of this and other manifestations of digitalis intoxication is due to a number of factors. There is no method that permits prediction of optimal digitalis requirements; digitalization, therefore, is frequently carried either overtly or inadvertently to a toxic endpoint. The state of digitalization, like all biological phenomena, is not static. An adequate maintenance dose at one time may prove inadequate or excessive at a later period. Furthermore, the margin between a therapeutic and a toxic dose narrows with advancing age and increasing heart failure. Lastly, there is an increasing dependence upon electrolyte manipulation in the management of patients with heart failure. Losses of potassium that may attend such measures predispose to intoxication.

Routine Blood Control and Prevention of Medicamental Hemopathies. T. K. With. Ugesk. læger 121:77-81 (Jan. 15) 1959 (In Danish) [Copenhagen].

Routine blood cell counts are of doubtful value in the prevention and early diagnosis of granulocytopenia induced by drugs and can at best be an adjuvant to clinical control. Clinical control consists in impressing on the patient at every consultation the risk involved in taking the drug in question and the paramount importance of immediate withdrawal of the drug and immediate contact with the physician for blood control in case of malaise, fever, sore throat, or sudden exanthem. The blood control must include both leukocyte and differential counts. Normal values in case of clinically alarming symptoms do not exclude a developing granulocytopenia. On normal values the count should be repeated daily for a week or until the symptoms have disappeared. The control must be maintained for the first 2 weeks after withdrawal of the medicament.

SURGERY

Multiple Simultaneous Complications of Peptic Ulcer. S. W. Moore and F. W. Fuller. Am. J. Surg. 97:184-190 (Feb.) 1959 [New York].

Between Jan. 1, 1940, and March 1, 1957, there were 969 admissions to the surgical wards of the New York Hospital for perforated, bleeding, or obstructed peptic ulcer. This group consisted of 775 different patients. Of the 969 admissions, 89 (9.2%) represented 82 different patients with a combination of 2 or 3 complications. The remaining 880 admissions represented 693 patients with only a single perforation, hemorrhage, or obstruction. In the entire study there were 152 patients with perforation, 678 with hemorrhage, and 233 with obstruction. In the group with multiple complications, there were 32 with perforation, 74 with hemorrhage, and 77 with obstruction. Thus, 21% of all patients with perforation had concurrently 1 or 2 other complications, as did 11% of all with hemorrhage, and 33% of all with obstruction. Fifteen of the 82 patients in the multiple entity group died, representing a mortality rate of 17% of 89 admissions in this group. Thirty-six of the 693 patients in the single entity group died, representing a mortality rate of 4% of the 880 admissions in this group. These findings showed that nearly 10% of the patients had more than one of the 3 complications (perforation, hemorrhage, and obstruction), and that such combinations produced a mortality 4 times as great as among patients with only one such complication.

There was a strong association of severe unrelated diseases, especially malignant tumors, in the multiple entity group. Twenty-one (over 25%) of the 82 patients were thus affected. That these associated lesions are often in an early and previously undiagnosed state at the time of the admission for the combined complications suggests that they may serve to exacerbate an existing ulcer tendency and that a severely complicated peptic ulcer may indeed be an early warning signal of their presence. A vigorous examination, especially for pulmonary disease, is indicated in every patient surviving combined complications of peptic ulcer. The triple combination of perforation, hemorrhage, and obstruction is much more common than previously believed, having occurred in 5 of the 82 patients with multiple complications.

The high mortality rate among patients with combined perforation and hemorrhage, when the hemorrhage is massive, was again confirmed. A search for multiple ulcers in the stomach and duodenum should be made whenever the operation of plication is done in a case of perforation, and primary gastric resection should be strongly considered if they are found. Simple gastroenterostomy, gastroenterostomy with vagotomy, or primary gastric resection should be performed for an obstructed perforated ulcer. Such an ulcer usually involves both the anterior and the posterior pyloric walls and makes more likely the occurrence of a massive postoperative hemorrhage as well as dehydration and electrolyte imbalance from pyloric obstruction, unless the additional procedure is performed. When actually confronted with a massive hemorrhage occurring near the time of perforation, the surgeon may be powerless because of the desperate general condition of the patient. Vigorous blood replacement coupled with immediate gastric resection usually offers the only hope for survival. The occurrence of multiple combined complications is a positive indication of advanced, intractable ulcer disease requiring definitive surgical treatment, usually gastric resection, at the earliest possible moment.

Acute Cholecystitis. J. J. Byrne. Am. J. Surg. 97:156-172 (Feb.) 1959 [New York].

The author presents a pathological and clinical review of 82 women and 52 men, between the ages of 24 and 91 years, with acute gallbladder disease, who were admitted to the surgical service of the Boston City Hospital. Microscopic examination of 75 pathological specimens obtained from these patients provided good evidence that gallbladders may be easily operated on within the first 10 days of an acute attack, and that the earlier this operation is performed, the less chance there is for subsequent

WASHINGTON NEWS

President May Veto Housing Bill . .
Report on New Patient Care Plan . .
Smathers Sponsors Keogh Bill . .
Health Standards for Aliens . .
Poison Labeling Legislation . .
Say Military Should Control Medicare . .

HOUSING BILL FACES VETO, LAWMAKERS WARN

Congressional Republican leaders assailed the housing bills approved by the House and Senate as "budget busting." They contended measures calling for such high levels of spending probably would be vetoed by President Eisenhower.

A House-Senate conference committee, composed of members of House and Senate banking committees, was resolving differences in the two measures. It was expected, however, that the final compromise would call for more spending than proposed by the administration.

A veto, if sustained, would jeopardize the fate of provisions of both measures authorizing the Federal Housing Administration to insure loans for construction of proprietary nursing homes, provisions backed by the American Medical Association. However, such loan guarantees could be approved later as separate legislation, or as part of another, scaled-down housing measure. They are not controversial.

In addition to the nursing home program the House-approved legislation authorized about 65 million dollars annually in direct federal loans for construction of college housing facilities for interns and nurses, 40 million dollars more than the budget requested. There was a similar provision in the Senate bill.

NEW PATIENT CARE PLAN STUDY BY PHS

After a two-year study the Public Health Service has offered a blueprint program for a new type of hospital operation known as "progressive patient care." The new system, which the PHS said "shows promise and which, in recent months, has aroused widespread interest," is based on the principle of using separate sections of the hospital to treat patients according to the severity of their illnesses.

For example, those recovering from major surgery or ill enough to require constant surveillance would be placed in special units in one part of the hospital. As the patients progressed in health, they would be moved to other sections with patients in similar stages of recovery.

The study, published in an 87-page document, was conducted by the PHS and private experts on hospital operations. It was headed by Dr. Jack C. Haldeman, chief of the division of hospital and medical facilities of the PHS Bureau of Medical Services.

In a statement Dr. Haldeman said, "since the general hospital is a focal point for community health, the progressive patient care concept envisions the general hospital of the future as a community health center—the focus for both outpatient and inpatient care; as much concerned with the care for the long-term patient (including the mentally ill and tuberculous) as it is now for the care of the short-term patient, as much concerned with extending good medical and hospital care to the home by assisting the physician in the care of the patient at home as with assisting him with the care of the patient in the hospital."

There are five phases of progressive patient care—intensive care, intermediate care, self care, and long-term care, all within the hospital. In addition, organized home care would be provided.

The most seriously ill, with certain exceptions, would be placed in the intensive care unit—a room with five or six patients under the constant surveillance of a professional nurse and a practical nurse or nursing aide around the clock.

The intermediate care unit would be more nearly patterned after conventional hospital units—that is, a floor of rooms with a staff of floor nurses. The self-care unit would consist of 16 to 20 beds, preferably in single rooms with private toilets, and staffed by one professional nurse and two aides or two practical nurses. Only a practical nurse or nurse's aide would be needed for the night shift.

The long-term care unit would be for chronically ill patients needing hospital attention and others who need lengthy care. In some respects it would assume the functions of a nursing home. A larger staff would be required than for the self-care division. The long-term unit might be feasible only for larger hospitals.

The home care program would provide coordinated services to patients at home through family physicians, public health nurses, and social caseworkers, assisted by clerical services at the hospital.

SMATHERS INTRODUCES SELF-EMPLOYED RETIREMENT BILL

Sen. George Smathers (D., Fla.) introduced a bill to encourage the self-employed to invest in retirement plans that is almost identical to the legislation that easily cleared the House earlier this year.

The lawmaker is a member of the Senate Finance Committee that is scheduled to hold hearings on the measure later this year. The bill, sponsored in the House by Rep. Eugene J. Keogh (D., N. Y.), provides tax deferral of 10% of net income up to $2,500 for self-employed such as physicians and lawyers who set money aside for their retirement in qualified plans.

Unlike the House measure the Smathers bill would take effect in the taxable year 1961, rather than 1959. The change, Smathers said, would "meet opposition to the pending proposal which was predicated primarily on revenue loss."

"Under the present federal tax structure, it is clear that preferential income tax treatment is given those wage earners and salaried employees whose employers set up qualified pension and/or profit-sharing plans in their behalf," said the senator.

Two other senators have also introduced the measure; they are Sen. Thruston B. Morton (R., Ky.), G. O. P. national chairman, and Sen. Estes Kefauver (D., Tenn.).

HEALTH STANDARDS URGED FOR ALIENS WITH INFECTIOUS DISEASES

The federal government should draw up regulations to bar admission to the United States, temporarily, of aliens with communicable diseases, the American Medical Association told Congress. The A. M. A. said the Public Health Service should be authorized to make recommendations concerning the issue of visas at the port of departure. Many severe illnesses are now automatically grounds for refusing admission, but not all are covered, nor are examinations soon before departure for this country requested.

In a letter to Sen. James O. Eastland (D., Miss.), chairman of the Senate Judiciary Committee, Dr. F. J. L. Blasingame, A. M. A. Executive Vice-president, said such regulations would protect not only American citizens but the aliens as well.

A Senate judiciary subcommittee is considering, among other bills, a House-passed measure that would extend permission for alien children suffering from tuberculosis to be admitted to this country, provided certain safeguards are met. It is designed mainly for Korean orphans adopted by American citizens.

In his letter, Dr. Blasingame said, "It is our hope that those who have undertaken the task of transporting these unfortunate children to new homes will continue their work. It is our belief, however, . . . that more stringent health controls are necessary."

Some children have entered the U. S. suffering from pneumonitis, scabies, and other communicable diseases, he noted.

HARZARDOUS SUBSTANCE BILL INTRODUCED

A measure requiring the precautionary labeling of hazardous substances not covered by the food and drug act has been introduced by Rep. Thomas B. Curtis (R., Mo.), a member of the influential House Ways and Means Committee.

The bill was drafted by the Committee on Toxicology of the American Medical Association after a number of conferences with industry, government, public health, and consumer groups. The measure received the favorable consideration of over 60 national organizations including organized labor, as well as a cooperative review from chemical trade associations who will be affected.

Representative Curtis, in introducing the measure, noted that, in recent years, "many new compounds for household, commercial, and industrial use have been introduced which are outside the scope" of the food and drug laws labeling provisions. "There is no broad law," he declared, "which requires th precautionary labeling of hazardous substances a the national level."

The model bill drafted by the A. M. A. Committee "reflects current knowledge of hazardous chemicals and the conditions under which they are employed," the lawmaker said. "One of the fundamental problems in reducing poisoning is the lack of identification of hazardous ingredients and precautionary labeling on the wide variety of small packaged chemical items in general use and the influence of this lack of identification on their careless and improper handling and storage.

"By requiring statements of harmful ingredients on labels, the bill will also aid physicians in the diagnosis and treatment of poisoning," said Representative Curtis.

It is not now requested that the labels on some products, such as some household cleansers for example, list harmful substances, even though consumption by children or constant exposure to adults could produce harmful effects.

MILITARY REJECTS PROPOSAL FOR CIVILIAN CONTROL OF MEDICARE

Dr. Frank B. Berry, Assistant Secretary of Defense, Health, and Medicine, said the Defense Department should continue to administer the "Medicare" program, providing treatment in civilian hospitals for qualified dependents of military personnel.

The official notified Congress that the department opposes suggestions made by the Florida Medical Association to provide an insurance program for such dependents and to transfer control to the Department of Health, Education, and Welfare, since those being treated are civilians. The proposals by the Florida association were made before a House appropriations subcommittee. Representatives of the association made it clear they were not criticizing the Defense Department in offering the recommendations.

Dr. Berry said military families are part of the military community, "and there appears to be no reason to separate them medically.

"Due to the fact that dependents are a highly transient population, there are many problems connected with the administration of any program of medical benefits that can be handled only by the uniformed services," he said.

PERSONNEL

Dr. F. J. L. Blasingame, Executive Vice-president of the American Medical Association, announced the resignation of Dr. Cyrus H. Maxwell of the A. M. A.'s Washington Office. Dr. Maxwell, who was responsible principally for the Association's liaison work with the Senate, has accepted a position with the Public Health Service in the Chronic Disease Branch of the Division of Special Health Services. His major assignment will be to work as a PHS representative in planning and carrying out the White House Conference on Aging.

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MEETINGS

AMERICAN MEDICAL ASSOCIATION: Dr. F. J. L. Blasingame, 535 North Dearborn St., Chicago 10, Executive Vice-President.
1959 Annual Meeting, Atlantic City, June 8-12.
1959 Clinical Meeting, Dallas, Texas, Dec. 1-4.
1960 Annual Meeting, Miami Beach, Fla., June 13-17.
1960 Clinical Meeting, Washington, D. C., Nov. 29-Dec. 2.
1961 Annual Meeting, New York City, June 26-30.
1961 Clinical Meeting, Denver, Nov. 28-Dec. 1.

AMERICAN

1959

June

Air Pollution Control Association, Hotel Statler, Los Angeles, June 22-26. Mr. Harry M. Pier, 4400 Fifth Ave., Pittsburgh 13, Executive Secretary.

American Academy of Tuberculosis Physicians, Atlantic City, N. J., June 6. Dr. Oscar S. Levin, P. O. Box 7011, Denver 6, Secretary.

American College of Angiology, World Conference on Angiology, Marlborough Blenheim Hotel, Atlantic City, N. J., June 5-7. Dr. Alfred Halpern, 11 Hampton Court, Great Neck, N. Y., Executive Secretary.

American College of Chest Physicians, Atlantic City, N. J., June 3-7. Mr. Murray Kornfeld, 112 E. Chestnut St., Chicago 11, Executive Director.

American Diabetes Association, Chalfonte-Haddon Hall, Atlantic City, N. J., June 6-7. Dr. E. Paul Sheridan, 1 East 45th St., New York 17, Secretary.

American Electroencephalographic Society, Claridge Hotel, Atlantic City, N. J., June 11-14. Dr. Jerome K. Merlis, University Hospital, Baltimore 1, Secretary.

American Gastroenterological Association, Claridge Hotel, Atlantic City, N. J., June 5-6. Dr. Franz J. Ingelfinger, 69 E. Newton St., Boston 18, Secretary.

American Gastroscopic Society, Atlantic City, June 7. Dr. Arthur M. Olsen, 200 First St., S. W., Rochester, Minn., Secretary-Treasurer.

American Medical Association, Traymore Hotel, Atlantic City, N. J., June 8-12. Dr. F. J. L. Blasingame, 535 N. Dearborn St., Chicago 10, Executive Vice-President.

American Medical Women's Association, Sheraton Ritz Carlton Hotel, Atlantic City, N. J., June 4-7. Miss Lillian T. Majally, 1790 Broadway, New York 19, Executive Secretary.

American Neurological Association, Claridge Hotel, Atlantic City, N. J., June 15-17. Dr. Charles Rupp, 133 S. 36th St., Philadelphia 4, Secretary.

American Orthopedic Association, Lake Placid Club, Lake Placid, N. Y., June 16-18. Dr. Lee Ramsey Straub, 535 E. 70th St., New York 21, Secretary.

American Physical Therapy Association, Hotel Leamington, Minneapolis, June 21-26. Miss Annetta Cornell Wood, 1790 Broadway, New York 19, Executive Director.

American Proctologic Society, Shelburne Hotel, Atlantic City, N. J., June 15-18. Dr. Norman D. Nigro, 10 Peterboro St., Detroit 1, Secretary.

American Rheumatism Association, Mayflower Hotel, Washington, D. C., June 2-6. Dr. Edward F. Hartung, 580 Park Ave., New York 21, Secretary.

American Therapeutic Society, Shelburne Hotel, Atlantic City, N. J., June 4-7. Dr. Oscar B. Hunter Jr., 915-19th St., N. W., Washington 6, D. C., Secretary.

Association for Research in Ophthalmology, Inc., Atlantic City, N. J., June 8-12. Dr. Lorand V. Johnson, 10515 Carnegie Ave., Cleveland 6, Secretary-Treasurer.

Idaho State Medical Association, Sun Valley, June 14-17. Mr. Armand L. Bird, 364 Sonna Bldg., Boise, Executive Secretary.

Intermountain Pediatric Society, Sun Valley, Idaho, June 26-28. Dr. J. R. Newton, Memorial Medical Center, 2000 S. 9th E., Salt Lake City, Utah, Publicity Chairman.

International Cardiovascular Society, North American Chapter, Hotel Shelburne, Atlantic City, N. J., June 6. Dr. Paul T. DeCamp, 3503 Prytania St., New Orleans, Secretary.

Maine Medical Association, The Samoset, Rockland, June 21-23. Dr. Daniel F. Hanley, P. O. Box 240, Brunswick, Executive Director.

Medical Library Association, King Edward-Sheraton Hotel, Toronto, Can., June 15-19. Miss Nettie A. Mehne, The Upjohn Co., Kalamazoo, Mich., Secretary.

Society for Investigative Dermatology, Ritz Carlton Sheraton Hotel, Atlantic City, N. J., June 6-7. Dr. Herman Beerman, 255 S. 17th St., Philadelphia 3, Secretary.

Society of Biological Psychiatry, Claridge Hotel, Atlantic City, N. J., June 13-14. Dr. George N. Thompson, 2010 Wilshire Blvd., Los Angeles 57, Secretary.

Society of Nuclear Medicine, Palmer House, Chicago, June 18-20. Dr. Morris T. Friedell, 104 S. Michigan Ave., Chicago 3, Chairman, Press & Public Relations Committee.

South Dakota State Medical Association, Sheraton Johnson Hotel, Rapid City, June 20-23. Mr. John C. Foster, 300, 1st National Bank Bldg., Sioux Falls, Executive Secretary.

The Endocrine Society, Chalfonte-Haddon Hall, Atlantic City, N. J., June 4-6. Dr. Henry T. Turner, 1200 N. Walker St., Oklahoma City 3, Secretary.

Upper Peninsula Michigan Medical Society, Gateway, Land of Lakes, Wis., June 19-20. Dr. Richard D. Cecconi, Iron Mountain, Mich., Secretary.

Wyoming State Medical Association, Jackson Lake Lodge, Moran, June 11-14. Mr. Arthur R. Abbey, Box 2036, Cheyenne, Executive Secretary.

July

American Society of Facial Plastic Surgery, New York City, July 17. Dr. Samuel M. Bloom, 123 E. 83rd St., New York 28, Secretary.

American Society of X-ray Technicians, Shirley Savoy Hotel, Denver, July 4-9. Miss Genevieve J. Eilert, 16 14th St., Fond du Lac, Wis., Executive Secretary.

Oregon Cancer Conference, University of Oregon Medical School, Portland, July 16-17. Dr. Martin A. Howard, 1115 S. W. Taylor St., Portland 5, Ore., *Chairman*.

Rocky Mountain Cancer Conference, Brown Palace Hotel, Denver, July 22-23. Dr. N. Paul Isbell, 835 Republic Bldg., Denver 2, Chairman.

August

American Congress of Physical Medicine and Rehabilitation, Hotel Leamington, Minneapolis, Aug. 30-Sept. 4. Miss Dorothea C. Augustin, 30 N. Michigan Ave., Chicago 2, Executive Secretary.

American Dietetic Association, Statler Hilton, Los Angeles, Aug. 25-28. Miss Ruth M. Yakel, 620 N. Michigan Ave., Chicago 11, Executive Secretary.

American Hospital Association, Statler Hotel, New York City, Aug. 24-27. Dr. Edwin L. Crosby, 18 E. Division St., Chicago, Director and Secretary.

American Veterinary Medical Association, Hotel Muehlebach, Kansas City, Mo., Aug. 24-28. H. E. Kingman Jr., D.V.M., 600 S. Michigan Ave., Chicago 5, Executive Secretary.

Biological Photographic Association, Inc., Sheraton-Mount Royal Hotel, Montreal, Canada, Aug. 31-Sept. 3. Miss Jane H. Waters, Box 1668, Grand Central P. O., New York 17, Executive Secretary.

National Medical Association, Detroit, Aug. 10-13. Dr. John T. Givens, 1108 Church St., Norfolk, Va., Secretary.

Nevada State Medical Association, Reno, Aug. 19-22. Dr. Gilbert G. Lenz, *505 S. Arlington Ave., Reno, Nev., Chairman*.

Rocky Mountain Radiological Society, Shirley-Savoy Hotel, Denver, Aug. 20-22. Dr. John H. Freed, 4200 E. Ninth Ave., Denver 20, Secretary-Treasurer.

West Virginia State Medical Association, The Greenbrier, White Sulphur Springs, Aug. 20-22. Mr. Charles Lively, P. O. Box 1031, Charleston 24, Executive Secretary.

September

American Association of Medical Clinics, Sheraton-Blackstone Hotel, Chicago, Sept. 24-26. Dr. Edwin P. Jordan, Box 58, Charlottesville, Va., Executive Secretary.

American Association of Obstetricians and Gynecologists, The Homestead, Hot Springs, Va., Sept. 10-12. Dr. E. Stewart Taylor, 4200 E. Ninth Ave., Denver 20, Secretary.

American Association for the Surgery of Trauma, Mount Washington Hotel, Bretton Woods, N. H., Sept. 24-26. Dr. William T. Fitts, Jr., 3400 Spruce St., Philadelphia 4, Secretary.

American College of Gastroenterology, Biltmore Hotel, Los Angeles, Sept. 19-26. Mr. Daniel Weiss, 33 W. 60th St., New York 23, N. Y., Executive Director.

American College of Surgeons, The Traymore Hotel, Atlantic City, N. J., Sept. 28-Oct. 2. Dr. Paul R. Hawley, 40 E. Erie St., Chicago 11, Director.

American College of Surgeons, Ohio Chapter, Statler Hotel, Cleveland, Sept. 11-12. Dr. Berton M. Bogle, 311 S. Market, Troy, Ohio, Secretary-Treasurer.

American Roentgen Ray Society, The Netherland Hilton Hotel, Cincinnati, Sept. 22-25. Dr. C. Allen Good, Mayo Clinic, Rochester, Minn., Secretary.

American Society of Clinical Pathologists, The Palmer House, Chicago, Sept. 7-11. Mr. Claude E. Wells, 2052 N. Orleans, Chicago 14, Executive Secretary.

Central Association of Obstetricians and Gynecologists, Drake Hotel, Chicago, Sept. 24-26. Dr. Edwin J. DeCosta, 104 *S. Michigan* Ave., Chicago 3, Secretary.

College of American Pathologists, The Palmer House, *Chicago*, Sept. 6. Dr. Arthur H. Dearing, Suite 2115, Prudential Plaza, Chicago 1, Executive Director.

Colorado State Medical Society, Brown Palace and *Shirley* Savoy Hotels, Denver, Sept. 8-11. Mr. Harvey T. Sethman, 835 Republic Bldg., Denver 2, Executive Secretary.

International College of Surgeons, Tennessee Section, Chattanooga, Sept. 28-29. Dr. William G. Stephenson, Medical *Arts* Bldg., Chattanooga, Tenn., Regent.

Kentucky State Medical Association, Columbia Audit*orium*, Louisville, Sept. 22-24. Mr. Joseph P. Sanford, 1169 Eastern Pkwy., Louisville 17, Ky., Executive Secretary.

Maryland, Medical and Chirurgical Faculty of the State of, Semi-annual Meeting. Ocean City, Sept. 18. Mr. John Sargeant, 1211 Cathedral St., Baltimore 1, Executive Secretary.

Medical Progress Assembly, Tutwiler Hotel, Birmingham, Ala., Sept. 13-15. Dr. Herbert H. Thomas, 920 S. 19th St., *Birmingham*, Ala., Chairman, Publicity Committee.

Michigan State Medical Society, Pantlind Hotel, *Grand* Rapids, Sept. 28-29, Oct. 1-3. Mr. William J. Burns, 606 Townsend St., Lansing 15, Mich., Executive Secretary.

Mid-Continent Psychiatric Association, Holiday *Inn* Motor Hotel, St. Louis County, Mo., Sept. 18-20. Dr. W. Payton Kolb, Baptist Medical Arts Bldg., Little Rock, Ark., Secretary.

Montana Medical Association, Finlen Hotel, Butte, Sept. 17-19. Mr. L. Russell Hegland, 1236 N. 28th St., Billings, *Mont.*, Executive Secretary.

National Recreation Congress, Morrison *Hotel*, Chicago, Sept. 28-Oct. 2. Mr. Jesse Reynolds, Department of Recreation and Parks, The Mosque, Laurel and Main Streets, Richmond *20, Va.*, Chairman.

North American Federation, International College of Surgeons, Chicago, Sept. 13-17. For information write the *Secretariat*, 1516 Lake *Shore Dr., Chicago 10.*

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POLYPS OF THE COLON AND RECTUM

A FOUR-YEAR TO NINE-YEAR FOLLOW-UP STUDY OF FIVE HUNDRED THIRTY-SEVEN PATIENTS

J. Alfred Rider, M.D., Joseph B. Kirsner, M.D., Hugo C. Moeller, M.D.
and
Walter L. Palmer, M.D., Chicago

In a six-year period, 9,669 proctosigmoidoscopic and x-ray examinations resulted in detection of polyps in 537 patients. A vigorous follow-up program from four to nine years later revealed that new polyps developed in approximately 40% of these patients, indicating need for frequent reexamination. Incidence of carcinoma of the colon was twice as high in patients with multiple polyps as in those with single polyps. Local removal appeared to be adequate treatment for benign polyps and for adenocarcinoma within reach of the proctosigmoidoscope.

IN A previous paper[1] the incidence of polyps of the colon and rectum and their relationship to carcinoma was reported in 7,487 patients undergoing proctoscopic and x-ray surveys as part of routine gastrointestinal examination during the interval from Jan. 1, 1947, to Dec. 31, 1951. Polyps of the rectum or colon were found in 401 patients. From Jan. 1, 1952, to Dec. 31, 1952, 136 additional patients with polyps were discovered in a series of 2,182 similar examinations. Thus, 537 patients with polyps were noted among 9,669 undergoing routine examinations in a period of six years, an incidence of 5.5%.

Some of the original 401 patients were reexamined at least yearly from 1947 to 1951. But from Jan. 1, 1952, to Dec. 31, 1956, a vigorous attempt was made to persuade each of the 537 patients to return yearly for examination. This report is based on the four-year to nine-year follow-up survey.

The purposes of the present study were (1) to determine the practicability of a long-term program of periodic reexamination of patients of this type; (2) to determine the rate of formation of new polyps and the possible relationship of these lesions to carcinoma of the colon; (3) to observe the fate of patients whose polyps presented early malignant change and yet were excised locally; (4) to evaluate the diagnostic roles of x-ray examination and proctosigmoidoscopy; and (5) to attempt to determine whether a systematized examination of patients prone to develop polyps, and the consequent early detection and treatment of malignant and premalignant lesions, would result in a higher rate of curability of carcinoma.

Practicability and Cost of Program

Problem of Patients' Cooperation.—Cooperation of the patients is essential in any long-term follow-up study. Since this program was designed to select

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From the Department of Medicine, University of Chicago. Drs. Rider and Moeller are now at the University of California School of Medicine, San Francisco.

subjects consecutively, no attempt was made in advance to determine the willingness of the patients to participate; nevertheless, the over-all response was encouraging.

A yearly letter was sent to each of the 537 patients, explaining the significance of the program and inviting their return for examination at no cost.

TABLE 1.—*Patients Reexamined Each Year, 1953-1956*

	Patients			Examinations, No.				
	Dead		Living					
Yr.	At Beginning of Year	During Year		Proctoscopy	X-Ray	Both	Examinations Total	Total Reexamined, %
1953	26	16	495	81	7	266	354	71.5
1954	42	15	480	42	11	272	325	67.7
1955	57	6	474	25	19	282	326	68.8
1956	63	7	467	38	18	277	333	71.3

If no reply was received, a second letter was sent. The third attempt consisted of a registered letter. If these measures failed, the patient was called on the telephone at home or at work. In individual cases relatives or family physicians were helpful in reaching the patients for return examination.

The general results seem excellent. Of the 537 patients 498 (92.7%) had at least one follow-up examination. A total of 149 patients participated in at least four consecutive years of follow-up study. [illegible] patients cooperated from the outset; others, [illegible]erating initially, participated in the second, [illegible] fourth years either because their attitude changed or because they had developed a medical problem. Only 39 patients (7.3%) failed to return during the course of the study, although presumably they were alive. Twenty-three individuals refused to return, offering reasons such as good health, antagonism toward the hospital or its personnel, age, the inconvenience or unpleasantness of the examination, or failure to understand the significance or necessity of the program.

Table 1 summarizes the yearly distribution of the total number of reexaminations during the last four years of the study. The high percentage of surviving patients reexamined during 1956 (71.3%), identical with that during 1953 (71.5%), reflects the patients' splendid cooperation.

Cost of Program.—The practicability of the program depended in large measure on the willingness of the staff to provide follow-up examinations at no cost; for, as a rule, no charge was made for the proctosigmoidoscopy and follow-up visits. The yearly x-rays of the colon were financed largely by a grant from the National Institutes of Health, although in some cases the patients paid for them. The department of roentgenology performed the examinations at the bare cost of the materials.

Although the exact cost per individual patient or individual examination is difficult to estimate, the cost of the entire program can be approximated by totaling the amount contributed by the Public Health Service during the five years of the study, the amount of service donated by the staff in terms of the monetary value of the proctosigmoidoscopic examination, and the subsidy by the department of roentgenology in terms of income forfeited. No attempt has been made to place a monetary value on the time donated by us for our roles in organizing and supervising the project, performing examinations, analyzing data, or submitting annual reports.

The estimated contribution of each of the above participants to the "polyp project" from Jan. 1, 1952, to Dec. 31, 1956, was as follows: National Institutes of Health grants, \$48,104; proctoscopic examinations (1,618 at \$10 each), \$16,180; subsidy by department of roentgenology for x-rays of the colon (1,354 at \$18 each), \$24,372. According to these estimations the total cost of the study was \$88,656, representing an average cost of approximately \$195 per original patient for the entire study. Similar low-cost rates will not be possible for future follow-up projects.

Formation of New Polyps and Relationship of Polyps to Carcinoma

Rate of Formation of New Polyps.—Of the 537 patients 372 had follow-up examinations four or more years after their original polyps were discovered. The rate of formation of new polyps of the colon in this group was very high, 153 patients or 41.1%.

As noted in our previous report[1] patients with multiple polyps at the original examination manifested a greater tendency to develop new polyps than patients with single polyps, although in both groups the rate of new formation greatly exceeded the 5% expectation for the general population. In the patients with multiple polyps the rate of new formation was 55.7%; in those with single polyps, 38.5%.

Table 2 shows in detail the distribution of patients by year of follow-up examination. The percentage of new polyp formation ranged from 9.3 to 15.9; during the last four years the yearly rate of recurrence approximated 10%. Thus, the year of follow-up examination seemed to make little difference with respect to the percentage of patients found to have developed new polyps.

TABLE 2.—*Distribution of Patients Participating in Follow-up Studies by Rate of Recurrence*

		Patients with New Polyps, No.			
				Combined Total	
Follow-up Period, Yr.	Total Returning, No.	Originally with Single Polyps	Originally with Multiple Polyps	No.	%
1	392	31	18	49	12.5
2	271	34	9	43	15.9
3	311	33	10	43	13.8
4	310	28	14	42	13.5
5	249	23	5	28	11.2
6	154	14	1	15	9.7
7	107	10	0	10	9.3
8	67	6	1	7	10.4
9	30	3	0	3	10.0

The histological diagnoses[1] of the original polyps also appeared not to correlate significantly with the rates of new polyp formation (table 3), except for a slight tendency toward fewer new polyps in the group with benign lesions than in those with malignant polyps; but this difference is of doubtful significance because of the small size of the samples.

Relationship of Polyps to Carcinoma of the Colon.—The incidence of carcinoma of the colon in 9,132 patients without polyps was approximately 2%. Among the 537 patients with polyps, the incidence of carcinoma in the polyps was 5.8% (not including adenocarcinoma or associated colonic carcinoma).

Table 4 lists the original pathological diagnoses[1] with respect to single and multiple polyps. In the patients with single polyps 19 had carcinomatous polyps and 33 had associated carcinoma of the colon, an incidence of 11.6%; whereas in the patients with multiple polyps 12 had carcinomatous polyps and 6 had associated carcinoma of the colon (20.7%). The total incidence of carcinoma, either associated with polyps or in the polyps, exclusive of adenocarcinoma, was 13%. If adenocarcinoma is added, the combined incidence of malignant polyps and/or associated carcinoma was 32.2%.

Analysis of Deaths from Carcinoma.—As indicated in table 5, 32 (46%) of the 70 known deaths, as of Dec. 13, 1956, were caused by carcinoma and 25 (78.1%) by gastrointestinal cancer. Deaths from carcinoma of the colon accounted for 16 (50%) of the total deaths from cancer in various sites, a very high rate. A higher rate of deaths from carcinoma occurred among patients with original diagnoses of multiple polyps than among those with single polyps: 8 patients (9%) of the 87 with multiple polyps died, whereas 24 (5%) of the 460 patients with original diagnoses of single polyps died.

For 13 of the 32 patients the diagnosis of carcinoma was made at the time of the original examination; 19 had no carcinoma at this time but later died of it. The distribution of deaths from carcinoma in terms of its presence or absence at the time of the original examination was as follows: Of 24 with single polyps, 9 did and 15 did not have carcinomas; of 8 with multiple polyps 4 did and 4 did not have carcinoma.

TABLE 3.—*Comparison of Original and Subsequent Pathological Diagnoses of Polyps*

		No New Polyps		Subsequent Polyps, Diagnosis*					New Polyps	
Patients, No.	Original Diagnosis	No.	%	Benign	Questionable	Adenocarcinoma	Carcinoma	No Diagnosis	No.	%
	Benign									
37	Multiple	19	51.4	16	...	...	...	2	18	48.6
197	Single	120	60.9	59	5	4	4	5	77	39.1
234	Total	139	59.4	75	5	4	4	7	95	40.6
	Questionable									
7	Multiple	1	14.3	1	2	2	1	...	6	85.7
37	Single	22	59.5	11	...	1	1	2	15	40.5
44	Total	23	52.3	12	2	3	2	2	21	47.7
	Adenocarcinoma									
10	Multiple	4	40.0	1	...	2	1	2	6	60.0
46	Single	28	60.9	9	1	2	3	3	18	39.1
56	Total	32	57.1	10	1	4	4	5	24	42.9
	Carcinoma									
7	Multiple	3	42.9	4	...	...	...	...	4	57.1
21	Single	12	57.1	5	...	2	2	...	9	42.9
28	Total	15	53.6	9	...	2	2	...	13	46.4
	No diagnosis									
...	Multiple	...	...	...	...	...	...	...	...	...
10	Single	10	100.0	...	...	...	...	...	...	...
10	Total	10	100.0	...	...	...	...	...	...	...
372	Grand Total	219	58.9	106	8	13	12	14	153	41.1

* In cases where more than one subsequent polyp was found only the most significant pathological diagnosis was recorded.

To determine the incidence of subsequent carcinoma a detailed analysis was made of the 372 patients who were examined four or more years after the original diagnoses. Among the 311 patients originally diagnosed as having single polyps 10 (3.2%) were subsequently found to have carcinomatous polyps and/or associated carcinoma of the colon; among the 61 patients with multiple polyps originally 2 (3.3%) were subsequently found to have carcinomatous polyps and/or associated carcinoma of the colon. The incidence of subsequent carcinoma in the total 372 patients with single and multiple polyps was 3.2%, significantly lower than the 13% in the original group of 537 patients examined at the beginning of the study. The decrease may reflect the beneficial effect of prompt removal of the premalignant lesion. If adenocarcinomatous polyps are included, the incidence of subsequent malignancy was 6.7%, far below the corresponding figure of 32.2% noted on the original examination and again suggesting the possible beneficial effect of early removal of polyps.

Only five deaths from carcinoma of the colon had occurred four to nine years after an original examination showed no evidence of carcinoma. On the basis of the original group of 467 patients without carcinoma, this incidence is 1.1%. This figure can be compared to the 11 deaths occurring four to nine years later among the 70 patients who did have carcinoma at the time of the original examination, as either a carcinomatous polyp or an associated colonic carcinoma, an incidence of 15.7%. (It is only a coincidence that there were 70 original carcinoma cases and a total of 70 deaths in patients in the study.)

Patients Whose Polyps Manifested Adenocarcinomatous Change

Follow-up data are available on 56 patients with polyps originally diagnosed as adenocarcinoma (carcinoma in situ or adenocarcinoma grade 1). Thirty-two (57.1%) had no subsequent polyp formation; 19 of the 28 with single polyps had been treated by local biopsy only and 9 by simple surgical excision. Twenty-four patients (42.9%) subsequently developed polyps; 8 were adenocarcinomatous or frankly carcinomatous polyps, and these merit further description.

CASE 1.—A 55-year-old woman had a large fungating mass, diagnosed as adenomatous rectal papilloma, probably carcinoma, which was removed by biopsy snare at a level 17 cm. above the anal ring. Two weeks after this an adenocarcinomatous polyp was removed at the same level, again by biopsy snare at proctoscopy. Three years after this removal the patient underwent an anterior resection of the sigmoid colon for adenocarcinoma, with an end-to-end anastomosis. Two years postoperatively, results of proctosigmoidoscopic examination were negative. Three years later the patient reported that she remained in good health.

TABLE 4.—*Original Pathological Diagnoses*

	Single Polyps	Multiple Polyps
Benign and questionable	325	60
Carcinomatous	19	12
Adenocarcinomatous	88	15
No diagnosis	18	0
Total	450	87
Associated carcinoma of colon	33	6

CASE 2.—A 39-year-old woman had three polyps, from 1 to 2 cm. above the anal ring, which were removed by minor surgery. These were diagnosed as adenomatous, adenocarcinomatous, and adenomatous hyperplastic, respectively. Two years postoperatively two polyps were removed locally from the 5-cm. level and were diagnosed as hyperplastic rectal mucosa. After another two years the patient again developed numerous small polyps, located immediately inside the anal ring in a hypertrophied, friable mucosa. A surgical transanal partial excision was performed. Seven months after this, proctosigmoidoscopy revealed a sessile polyp; this was removed by local surgery, and the diagnosis again was adenocarcinoma. The next year the patient was found to have a plaque-like area of adenocarcinoma just inside the anal ring; this area was fulgurated. Examinations two and three years subsequently (six and seven years, respectively, after the original diagnosis) showed no further disease.

CASE 3.—A 56-year-old woman had an adenocarcinomatous polyp at the splenic flexure, which was excised. Two years postoperatively the patient developed another adenocarcinoma at the 13-cm. level, which was excised locally. In the third year of follow-up study the patient underwent a sigmoid polypectomy for an adenocarcinomatous polyp. In the fourth year a polyp, diagnosed as a hyperplastic mucosal nodule, was found at the 11-cm. level. The examination showed no further disease in the fifth year, but in the sixth year a polyp was discovered in the hepatic flexure; this has not yet been removed.

CASE 4.—A 66-year-old man had an adenocarcinomatous polyp just within the anal ring, which was removed. The next year the patient had another adenocarcinoma in a similar area. In the second year of follow-up study the patient was noted to have a similar lesion in the same location; 10 months later a fungoid mass was found on the anterior wall just inside the anus and excised. The pathological diagnosis was adenocarcinoma. In the fourth year a combined abdominal-perineal resection was performed because of carcinoma. In the fifth year an adenocarcinomatous polyp was excised from the colostomy site. The x-rays at the sixth, seventh, eighth, and ninth year follow-up examinations showed no further disease.

CASE 5.—A 50-year-old man had three polyps at the sigmoid colon, which were removed by transabdominal incision. Two of these were diagnosed as adenocarcinoma, the other as a benign adenoma. In the third year a hyperplastic rectosigmoid polyp at the 13-cm. level was removed, and another polyp was seen in the proximal descending colon. Two polyps at the descending colon were excised by abdominal incision at the fourth-year follow-up examination. These were diagnosed as preinvasive carcinoma in a large polypoid adenoma and a small benign polyp, respectively.

CASE 6.—A 64-year-old man had a 5-mm. sessile polyp, diagnosed as adenocarcinoma, which was removed at the 13-cm. level. A biopsy was done on an irregular polypoid mass at the 7-cm. level. A diagnosis of malignant papillary adenomatosis of the rectum was made, and this lesion was removed surgically. In the second year of follow-up study a similar area was found at the 7-cm. level and diagnosed as adenocarcinoma; the lesion was cauterized by a local physician. During the fourth year of follow-up study a plaque of polypoid nodules was seen in the same area and a biopsy was done. The diagnosis was adenomatous polyp, possibly malignant. The patient refused the recommended surgical resection.

CASE 7.—A 59-year-old woman had a papillary adenocarcinomatous polyp, at the 8-cm. level, which was removed. Three subsequent proctosigmoidoscopies showed no further disease, but the fourth, performed seven months after the original polyp was found, revealed a 3-cm. polyp at the 7-cm. level. Biopsies indicated an adenocarcinomatous polyp, which was removed by surgical local excision. No polyps were discovered during four subsequent years of follow-up examinations.

TABLE 5.—*Analysis of Deaths in Patients Studied*

	Deaths, No.	% of Total Deaths	% of Total Carcinoma	% of Total Gastro-Intestinal Carcinoma
Total Deaths	70	100.0	...	...
Noncarcinoma	38	54.3	...	...
Carcinoma	32	45.7	100.0	...
Nongastrointestinal ..	7	10.0	21.9	...
Gastrointestinal	25	35.7	78.1	100.0
Colon	16	22.8	50.0	64.0
Other Sites	9	12.8	28.1	36.0

CASE 8.—A 57-year-old man had a 1.5-cm. polyp on a small stalk at the 8-cm. level, which was removed by cautery. The pathological diagnosis was adenocarcinoma. Biopsy of friable granular mucosa one and one-half years later demonstrated adeno-

carcinoma. One year later, although proctosigmoidoscopy showed no disease, a barium enema revealed a polyp of the sigmoid colon. A segmental resection of the sigmoid colon with primary end-to-end anastomosis was performed. Careful examination of the resected specimen revealed two polyps, one an adenocarcinoma and the other a benign adenomatous polyp. Repeated examinations, including x-ray and proctosigmoidoscopy, during the next three and one-half years showed no further disease (seven and one-half years of follow-up examination).

The course of these eight cases indicates the importance of repeated examinations at regular intervals. Death from a subsequent carcinoma may be prevented after proper local excision or fulguration of the lesions and early surgical resection. Patients with polyps originally diagnosed as adenocarcinomas do not appear more likely to develop subsequent polyps than any other group of patients with polyps. Only eight (14.3%) of these patients in whom adequate follow-up study was available developed additional malignant polyps and/or carcinoma. This figure is significantly lower than the 32.2% incidence of malignant polyps, carcinoma, and associated colonic carcinoma found at the original examination of the 537 patients with polyps. On the other hand this figure far exceeds the over-all incidence of malignant polyps and carcinoma noted in the total group of 9,669 patients (3.3%). Thus, patients with polyps appear more prone to develop malignant lesions in the colon and rectum than does the "average gostrointestinal patient."

Roles of X-ray Examination and Proctosigmoidoscopy in Early Discovery of Rectal and Colonic Neoplasms.—In our original study[1] 92.5% of the cases of patients with polyps were diagnosed by proctosigmoidoscopy, whereas x-ray examination accounted for 7.5%. On subsequent follow-up examinations, however, the number of cases diagnosed by x-ray examination alone increased substantially to 27.3%, probably as a result of the more frequent use of air contrast studies and the more careful examinations in these selected cases, stimulated by the knowledge that the patients were prone to develop polyps. Thus, while both procedures are indispensable, the results obtained by proctosigmoidoscopy are the more rewarding.

Comment

In a six-year period 9,669 proctosigmoidoscopic and x-ray examinations resulted in the detection of polyps in 537 patients. A vigorous follow-up program from four to nine years later yielded the following important information: At one time or another, 92.7% of the patients returned for examinations. Of the original group of 537 patients 372 were reexamined in the four-year to nine-year study; 41% of these developed new polyps. The rate of new polyp formation did not vary greatly during each year of study, ranging from 9.3 to 15.9%, but it was higher than usual, indicating that members of the group were "polyp-prone."

The incidence of carcinoma of the colon in patients without polyps was 2.1%. The original incidence of carcinomatous polyps in the 537 patients was 5.8%. An additional 7.2% had associated carcinoma of the colon; thus, 13% had carcinoma either in the polyp or in other sites. If the cases of carcinoma in situ (adenocarcinoma) are added to this figure, then the percentage of patients with polyps with evidence of malignancy is 32.2.

The incidence of subsequent carcinoma in the 372 patients was 3.2%, considerably below the incidence found at the beginning of the study. This decrease may reflect the preventive effect of prompt removal of a premalignant lesion. During the course of this study 70 patients died, 32 from carcinoma and, of these, 16 from cancer of the colon.

Local treatment, i. e., removal by biopsy or snare, with fulguration of the base, appears to be adequate in dealing with the histologically benign polyp within reach of the proctosigmoidoscope. Large polyps in the rectum or colon should be removed surgically. Polyps with focal areas of carcinoma, but without invasion of the stalk (adenocarcinoma grade 1 and carcinoma in situ), may be treated in the same manner as benign polyps, with frequent reexamination of the rectum and colon by proctosigmoidoscopy and barium enema. If invasion of malignant cells is demonstrated in the stalk of a pedunculated polyp or in the intestinal wall, the preferred treatment is that required for carcinoma.

Although there is probably great biological variability in the behavior of polyps, there is no direct evidence in this long-term study that all polyps are progressive lesions, eventually becoming cancerous, or that all carcinomas originate as benign polyps. Occasionally, early carcinoma or carcinoma in situ may be detected in a grossly benign polyp. Since there is no decisive clinical method of predicting the behavior or the pathology of the individual polyp, such lesions should be removed. The patient with polyps is prone to develop additional polyps and also carcinoma of the rectum or colon at other sites. The incidence of carcinoma of the colon in 9,132 patients without polyps was approximately 2%. In the 537 patients with polyps in the present study, the incidence of carcinoma in the polyps was 5.8%. The total incidence of carcinoma including associated carcinoma in other sites in the colon and excluding adenocarcinoma was 13%.

The results of these studies indicate that the individual colonic polyp, unless it is an obvious carcinoma, can be treated adequately by local fulguration or total removal by biopsy with no danger of local recurrence. The presence of a polyp is a signal, however, indicating an abnormal colonic mucosa prone to develop either new polyps with varying degrees of malignancy or carcinoma. Because of the predicted high rate of new polyp formation in patients prone to develop polyps, it is impossible on the basis of this study to determine when yearly reexamination is no longer necessary. However, the present analysis suggests that it is reasonably safe to discontinue such examinations after they have shown no further disease for five consecutive years.

Summary and Conclusions

The presence of a polyp in the colon or rectum is an indication of an abnormal mucosa prone to develop new polyps, benign or malignant. New polyps developed in approximately 40% of patients with polyps of the colon and rectum observed for from four to nine years. The yearly new polyp formation rate, approximating 10%, indicated a group of patients prone to develop polyps and requiring frequent reexamination.

The incidence of carcinoma of the colon was twice as high in patients with multiple polyps as in those with single polyps; the lowered incidence of subsequent carcinoma of the colon suggests the beneficial effects of early diagnosis and removal of polyps. Local removal appeared to be adequate treatment for benign polyps and for adenocarcinoma within reach of the proctosigmoidoscope. Patients with polyps should be examined annually until findings of at least five consecutive yearly proctosigmoidoscopic and roentgenologic examinations of the rectum and colon have been negative.

950 E. 59th St. (37) (Dr. Kirsner).

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Dr. Paul C. Hodges, Chairman Emeritus of the Department of Radiology, and his staff interpreted the roentgenograms for this study.

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STAPHYLOCOCCIC PNEUMONIA

Capt. Shakeeb Ede, Capt. George M. Davis
and
Capt. Francis H. Holmes, (MC), U. S. N.

The assumption that staphylococci have gained in importance among the causes of pneumonia is questioned. The comparison here made between statistics published before 1932 and the data assembled by the authors from 1,177 cases of acute pneumonia indicate a decline. But when staphylococcic pneumonia does occur it develops rapidly, the patient is liable to show sudden intensification of dyspnea and cyanosis, and serious complications are likely. Diagnosis depends on the bacteriologist, and treatment consists primarily of using the proper antibiotic. The disk-sensitivity method for determining the antibiotic has been practical and useful. Among the antibiotics tried by the authors, chloramphenicol with erythromycin and novobiocin with erythromycin have seemed to be the most reliable. Symptomatic medication is also necessary. When complications like pyopneumothorax, empyema, or progressive pleural effusions appear, early surgical intervention is advised, and close cooperation between surgeon and internist should be maintained.

Currently, one of the problems facing medicine is the apparent pandemic of staphylococcic infections. Almost every hospital has been alerted to or faced with the immediate problem of dealing with a seeming increase in staphylococcic infections. The literature on this subject is accumulating rapidly. Investigators in the field of antibiotic research and development continue to search diligently for the drug that will effectively and safely destroy the staphylococcus. Accredited hospitals have active committees on infections. Hospital staffs are encouraged to put aside one or more of the effective antistaphylococcic agents for special treatment of the more serious staphylococcic infections in order that, in case of an epidemic, "all of the eggs won't be in one basket." Some surgical technicians, assured by the availability of many broad-spectrum antibiotics, became a bit careless after 1940 and their techniques became less strict. However, with the increase in staphylococcic infections, surgical masks have again been pulled over the nose, visitors to the surgical suites have been more carefully screened and cautioned, nursery personnel have been more frequently examined, and many physicians have become more reluctant to prescribe antibiotics when indications are not clear. The

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From the U. S. Naval Hospital, Great Lakes, Ill.

question of the place of the staphylococcic pneumonias in this problem stimulated our group to this investigation.

After the sulfonamides became available, the majority of physicians became increasingly less concerned about cases of pneumonia. With the many effective antibiotics available, the oft-repeated phrase, "If pneumonia is present, I can cure that" seemingly was true. However, on occasions, this supreme confidence in the power of the antibiotics became shaken when a patient with a fulminating staphylococcic pneumonia failed to respond. Intensive search for the causative organism with particular reference to types of pneumococci responsible has given way now to such questions as "Is this a staphylococcic pneumonia?" and "Is it sensitive to an antibiotic?"

Many physicians are reviewing their knowledge about pneumonias. There is concern over whether a new type of pneumonia has developed more or less as the result of the use or the abuse of antibiotics. However, an excellent description was given by Reimann [1] in 1933 with references to similar good descriptions by Chickering and Park,[2] Netter,[3] Leichtenstern,[4] and others long before, indicating that perhaps we have just forgotten sound previous knowledge and need only to refamiliarize ourselves with a problem that was apparent before the word antibiotic was ever used.

Is the incidence of staphylococcic pneumonia really increasing? If so, perhaps we would be justified in assuming that the abuse of antibiotics may be a factor. Cole [5] reported on a series of 211 acute pulmonary infections from 1927 to 1928, stating that 9% were due to or associated with staphylococcus. Habbe [6] in 1929 called attention to the relatively high incidence of this organism found at autopsy in 270 cases of fatal acute pneumonia. Lyon, in 1922, felt that the staphylococcus was an important etiological agent (9.6%) in the acute pneumonias seen in children. Menten and associates [7] presented sound evidence that staphylococcic pneumonia was definitely a serious problem long before antibiotics were made available.

Results of Present Study

At the U. S. Naval Hospital, Great Lakes, Ill., from 1957 to 1958, there were 11,112 admissions. Of this group, there were 1,177 patients (10%) with acute pneumonia. Eighteen of these cases (1.5%) were of staphylococcic etiology. From 1956 to 1957, there were 477 (4.4%) cases of acute pneumonia in a total of 10,931 admissions. Seven of these (1.5%) were proved to be of staphylococcic etiology. The higher percentage of acute pneumonias in the 1957-1958 period was directly correlated to the influenza epidemic during this time.

From those that occurred during the past three years, 36 cases of staphylococcic pneumonia were analyzed. To determine how many patients of this group required some type of operation, the following complications and procedures were reviewed: death, 1; bilateral pyopneumothorax, 1; unilateral pyopneumothorax, 8; pleural effusion, 8; empyema, 10; lung abscess, 3; pericarditis, 1; shift and fixation of the mediastinum, 1; pneumatocele, 1; atelectasis, 2; thoracentesis (single or multiple), 16; thoracotomy with closed tube drainage, 15; partial lobectomy, 1; and decortication, 3.

While the follow-up period is still too short to evaluate distant complications, such as bronchiectasis, emphysema, or pulmonary fibrosis, to date only one case has shown residual bronchiectasis and we have been impressed with the ability of the pulmonary structures to effectively and apparently completely recuperate once the acute process is controlled. It is further believed that, quite possibly, the three decortication procedures might well have been avoided had surgical intervention been more prompt.

In these 36 cases collected since 1956, the only death occurred within 72 hours of the initiation of the patient's symptoms. Attention is directed to the fact that 34 of these cases were of primary pneumonia, apparently incurred outside the hospital in the same manner that bronchopneumonia or pneumococcic pneumonia is contracted. Two of the cases were of secondary pneumonia, one secondary to osteomyelitis and one secondary to a carbuncle on the neck. Each of these patients had a positive blood culture. None of those with primary pneumonia had positive blood cultures. It is considered most important to realize that most of these cases were not due to a "hospital organism." Four cases may have been due to a hospital organism in that two of the infants observed were children of staff physicians; the mother of one patient worked in the nursery and her throat culture showed coagulase-positive Staphylococcus aureus in almost pure culture, and one patient contracted his disease while under observation in a surgical ward. In each of these instances, the pneumonias were more severe, the complications more rapid, and the drug control more difficult. This has been our experience with the secondary infections arising immediately or shortly after surgical procedures. These seem to be hardier organisms, less amenable to medical therapy, and they give higher morbidity and mortality. Consequently, hospital organisms are to be feared.

All patients admitted had x-ray evidence of pneumonia, and the specific bacteriological agent responsible was determined by throat or sputum cultures or, whenever possible, blood or pleural fluid cultures. Certain of these cases were quite benign, did not clinically seem like the type of infection we fear, and responded relatively dramatically to various antibiotics. These might be classified with another type of acute pneumonitis wherein the throat and sputum cultures yield a high incidence of coagulase-positive Staph. aureus as an incidental finding. Yet, in each case, the organism was highly predominant in throat or sputum cultures and was sensitive to the antibiotic used by test; consequently, these cases were included. In each patient in whom a complication occurred, coagulase-positive Staph. aureus was cultured from the pleural fluid, empyema fluid, or abscess. Thus, it would seem that there has really been no increase in the problem but rather a reawakening that there has always been a problem.

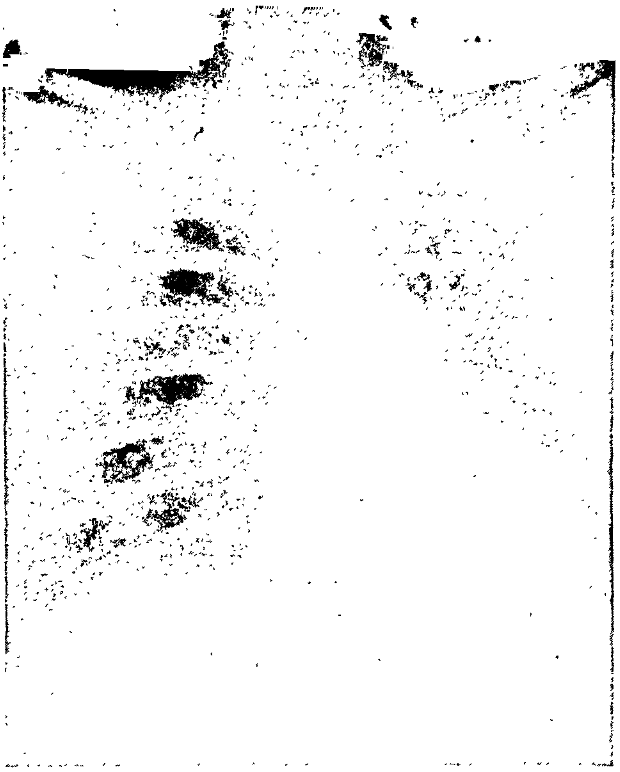

Fig. 1.—Roentgenogram of patient with staphylococcic pneumonia, showing minimal involvement during first 24-48 hours.

Predisposing Factors

The predisposing factors present in staphylococcic pneumonia were ably and frequently described by many competent observers long before antibiotics came into common use. Those that have impressed us are as follows: 1. An upper respiratory infection or influenza syndrome ushers in or is present immediately prior to the staphylococcic pneumonia. 2. Children, and particularly infants, seem more susceptible to the more fulminating forms of this type of pneumonia. As might be expected, patients with fibrocystic disease are reported to be highly susceptible and, when the complication of staphylococcic pneumonia is superimposed, it is quite likely to end fatally. 3. A focal infection, such as staphylococcic cellulitis, carbuncle, or osteomyelitis, may result in bacteremia with multiple lung implants and serious pneumonia. 4. Debilitated patients and defective children seem more disposed to develop staphylococcic pneumonia. Anal sis of the histories of our patients has shown litt to substantiate the feeling that the abuse of ant biotics has contributed to the incidence of th type of pneumonia to date.

What characterizes the patient with acute pne monia due to staphylococcus? On the whole, the is nothing short of bacteriological proof that de nitely identifies the disease clinically. Yet, certa signs, symptoms, or findings should alert the clin cian to this possibility. Again, it is emphasized th many excellent reviews have described these fin ings. Those that seem significant to us are as fo lows: 1. The presence of a dyspnea out of propo tion to the clinical findings of pneumonia. 2. In th more virulent forms, a dusky cyanosis of the li and nailbeds with the dyspnea. 3. The x-ray of th chest giving normal findings or showing minim involvement for the first 24 to 48 hours (fig. 4. X-ray finding of multiple lobe involvement scattered pneumonic areas within both lung fiel (fig. 2). 5. In the patient showing toxic reaction an obviously ill, pleural pain particularly associate with a rapid or progressive pleural effusion whi is not responding to the usual antibiotics. In 19 any patient who develops an empyema seconda to any acute pneumonia may have a staphylococc infection. 6. The entire hemithorax becoming ra idly involved (*this is almost invariably staphyloco cic in origin, particularly in an infant*). 7. Th development of pyopneumothorax or a bronch pleural fistula during the course of acute pneum nia. This virtually is an assurance of staphylococcu origin. This must be most carefully watched for an its development rapidly diagnosed and treated Often the patient, though acutely ill, is seemingl holding his own and then suddenly shows eve

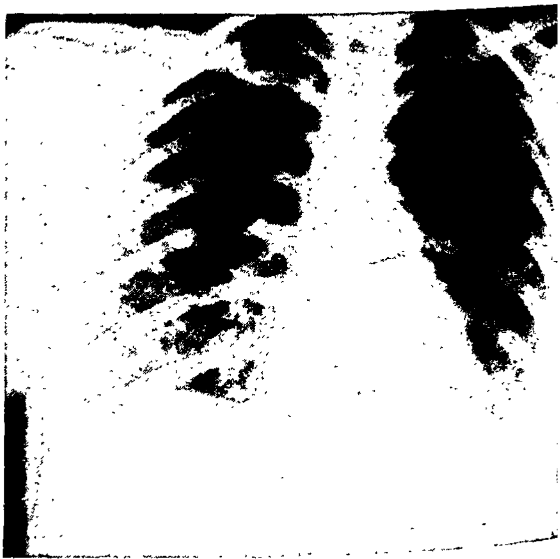

Fig. 2.—Roentgenogram showing multiple lobe involv ment.

more marked dyspnea, cyanosis, and even shock. Frequently, pleural pain heralds this; there may be progressive effusion prior to the pneumothorax and the clinician may become impressed with the amphoric quality of the breath sounds as tension builds up in the involved area prior to the perforation of the pleura. Pyopneumothorax may develop within one to four days after onset of illness in an infant or child. 8. Pneumatocele developing during the course of the acute pneumonia (fig. 3). 9. Any acute pneumonia with which pleural effusion or, certainly, empyema has developed (fig. 4).

Diagnosis

The roentgenologist is invaluable in diagnosis and follow-up study of patients with more serious staphylococcic pneumonia. Probably the first indication the roentgenologist has that a pneumonia is staphylococcic comes from the clinician who states his patient shows a greater toxic reaction than the x-ray findings would indicate. At least three of the present series of patients with pneumonia had negative findings on initial chest roentgenograms, although they were obviously in respiratory distress and acutely ill at the time of admission. Changes are rapid in staphylococcic pneumonia, and often a second chest x-ray taken within 24 hours will show rather extensive findings. As pointed out by Rigler in 1933,[8] without clinical correlation, the appearance of a typical staphylococcic pneumonia is almost identical with that of a *resolving* lobar *pneumonia* or bronchopneumonia. The most common x-ray finding on admission in the patients of this series was several small, roughly oval or rounded areas of consolidation, quite often bilateral. Change in the appearance is again the rule, and clearing of many of the original foci may be observed. Concurrent with this clearing will be the appearance of new foci either in the same lobes or in hitherto uninvolved lobes.

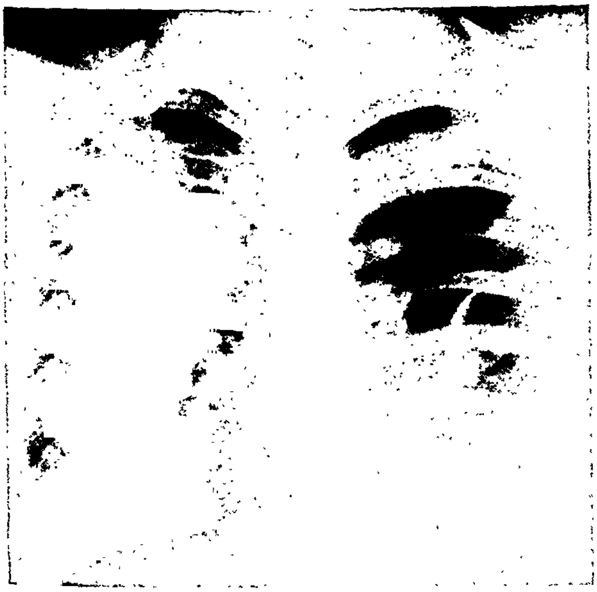

Fig. 3.—X-ray appearance of pneumatocele secondary to staphylococcic pneumonia.

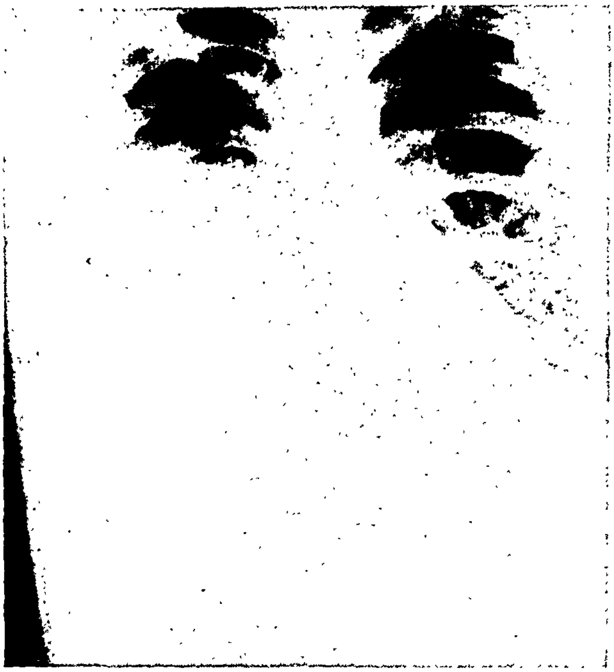

Fig. 4.—X-ray appearance of empyema as complication of staphylococcic pneumonia.

Infiltrates that persist will usually demonstrate cavity formation within 96 hours (fig. 5). Special overpenetrated films may be necessary to demonstrate the early cavitation. After cavitation, any of six courses may develop: (1) spontaneous resolution of a cavity, (2) coalescing of small cavities to form larger cavities, (3) evacuation of the fluid content and persistence of the cavity as a pneumatocele, (4) bronchopleural fistula formation (pyopneumothorax), (5) empyema formation without bronchopleural fistula, and (6) necrosis of affected lungs. The coalescing of small cavities is practically pathognomonic of staphylococcic pneumonia.

In connection with bronchopleural formation or pyopneumothorax, it is felt that this is always heralded by pleural irritation and the attendant formation of fluid. Fluid formation is a sign to which the clinician should be alerted immediately, as it is a forewarning that a crisis in the management of the patient should be expected. With this sign the surgeon promptly is notified, in the event that bronchopleural fistulation may occur and may be attended by mediastinal shift and collapse of enough lung so that closed drainage may be lifesaving.

Medical Treatment

The medical treatment of this serious disease consists primarily of using the proper antibiotic. Along this line of endeavor, certain things have been quite valuable to us:

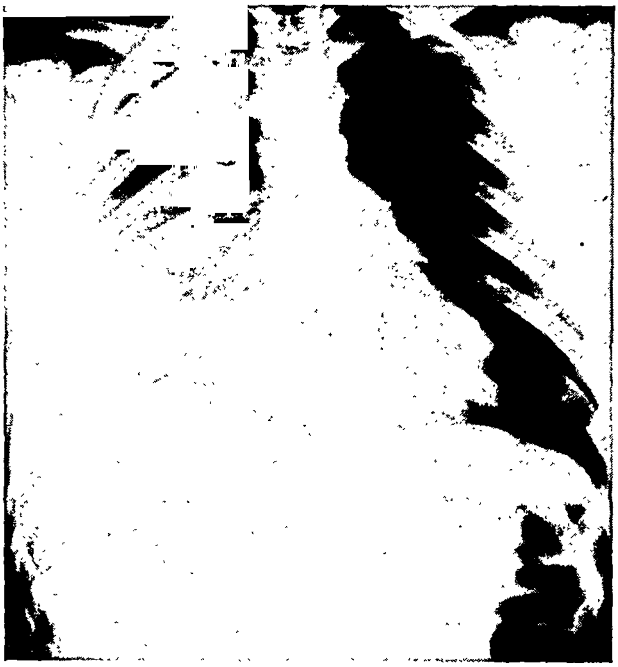

Fig. 5.—X-ray evidence of lung infiltration which has persisted to cavity formation.

First, the disk-sensitivity method of determining the appropriate antibiotic, available in most laboratories, has been practical and useful. Admittedly, it is not as accurate as the tube-dilution method; however, it is more rapid and more commonly available.

Second, some of these infections will respond quite satisfactorily to average doses of penicillin and/or tetracyclines. However, in the acutely ill patient with an unusual amount of dyspnea and toxicity, these two drugs may be totally ineffective, and, if they are relied on too long, the patient may die.

Third, chloramphenicol (Chloromycetin) with erythromycin and novobiocin with erythromycin have seemed to be our most reliable combinations. Full therapeutic doses are required. Often the use of all three has been effective. Continuation of therapy for 7 to 10 days after apparent recovery is advisable.

Fourth, ristocetin, kanamycin, and massive doses of penicillin have been used an insufficient number of times by our group to state their true value.

Fifth, oxygen, salicylates, anodynes, cough mixtures, and sedatives have been used as required symptomatically. Blood transfusions have been required in a few cases in which anemia seemed to contribute to slow convalescence. Gamma globulin has been used in critically ill patients, but its real efficacy could not be judged because of the variety of other agents being given at the same time. In patients in whom pleural pain was severe and agonizing, our anesthesiology department was singularly successful in giving marked relief by regional blocks with procaine derivatives. Steroids were used with apparent good results for a short time in one patient with overwhelming toxemia.

Surgical Treatment

Before a discussion of the surgical treatment of this disease is undertaken, it is well to recall that Staph. aureus has been believed to produce potent enzymes (hyaluronidase, proteinase, and coagulase) and toxins (hemolytic toxin, leukocidin, and necrotoxin; *alpha, alpha prime,* and *beta toxins* have also been described).

A fibrinolysin (staphylokinase) has also been found. One of the questions not infrequently puzzling to the clinician is, "Even if my antibiotic reaches and kills the organism, will the purulent material remaining, though bacteriologically sterile, continue to offend my patient?" In certain of our patients we have apparently achieved bacteriologically sterile cultures (blood, serous fluids, throat, and sputum), yet coalescing of abscesses, perforation of the pleura, and persistent fever has continued. Possibly the remaining toxin, e. g., the necrotoxin, remains active though the organism has been killed or is no longer reproducing. This concept lends support and logic to early surgical treatment of the complications.

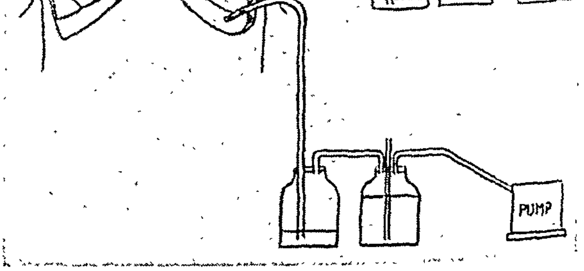

Fig. 6.—Diagram of underwater suction used in this series of cases.

The complications occurring within the thorax during the course of the pneumonia are pleural effusion, empyema, pneumatocele, atelectasis, lung abscess, pyopneumothorax or bronchopleural fistulation, pericarditis and mediastinal shift with pulmonary embarrassment and/or with fixation of the mediastinum in other than its proper anatomic position.

In the patient who died within 72 hours after initiation of symptoms, postmortem examination of the lungs revealed the characteristic process. The lungs were completely riddled by multiple small abscesses. Some of these were in the process of burrowing and coalescing to form larger abscesses. Little intervening lung remained for ventilation, and the patient literally suffocated.

A summary of some of our surgical recommendations is as follows: 1. The prompt placement of a closed drainage tube attached to suction equipment in a patient with developing pyopneumothorax or bronchopleural fistula may be lifesaving. Certainly, it will decrease morbidity. 2. Early thoracentesis in a pleural effusion is of great diagnostic value. If the patient is not improving, it is our belief that, often, the introduction of closed drainage for 24 to 48 hours (since the tube will likely remain closed after this) may result in a prompt improvement in the clinical condition of the patient. We have not seen any complications from this form of therapy, have found it safe and well tolerated by the patients, and believe that it may have prevented progression of the disease and the necessity for decortication procedure later. Repeated thoracentesis is to be avoided. When the patient is not definitely improving and fluid is present and has been shown on culture to contain pathogenic staphylococci, we favor early closed-tube drainage in preference to repeated thoracenteses, even if the fluid is not empyematous in appearance. 3. Certainly, prompt drainage of empyema is indicated. Delay in this with reliance on repeated thoracentesis results in loculation of fluid difficult to find, in long morbidity for the patient, and in almost certain necessity for eventual decortication. 4. As a rule, pneumatoceles are left alone; many have been seen to completely disappear after several months' follow-up study.

The technique for closed drainage with suction as employed by our group is as follows: With the patient in bed and under local anesthesia, an incision about 1 in. long is made in the skin of the chest wall in the intercostal space overlying the area involved. The incision is continued through the subcutaneous tissue, fascia, and muscle layer to the intercostal muscle. An anesthetist may give oxygen under positive pressure to prevent collapse of the involved lung when the pleural cavity is entered. A 32 F. catheter is then inserted through the intercostal muscle with a large, blunt hemostat. Occasionally, a small catheter is necessary in an infant, but, by compression of the end of the catheter with the hemostat, large catheters can be safely passed between the ribs. Reliance on small catheters has been unsuccessful in our experience because they will not remain open a sufficient length of time. The catheter is secured adequately and connected to underwater seal and suction (fig. 6). The wound is closed in layers and dressing applied. Change of catheters as necessary to prevent collapse, empyema, or mediastinal shift is performed.

Summary

An attempt to correlate the incidence of primary staphylococcic pneumonia with the use of antibiotics revealed that the incidence is apparently no greater now than prior to the development of antibiotics. Thirty-four cases of primary staphylococcic pneumonia and two cases of secondary staphylococcic pneumonia observed at the U. S. Naval Hospital, Great Lakes, Ill., since 1955, were included in the study. Chloramphenicol (Chloromycetin) plus erythromycin, novobiocin plus erythromycin, or a combination of all three seemed to give the most favorable results in the medical management of the disease. A high incidence of complication was seen with this form of pneumonia.

Close cooperation between the surgeon and internist should be maintained, and early surgical intervention is advisable when complications arise. The prompt institution of closed tube drainage with use of a large catheter (30 to 32 F.) for pyopneumothorax, empyema, and progressive pleural effusions has been instrumental in saving lives and reducing morbidity.

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FECAL IMPACTION IN MODERN PRACTICE

Karl-Albert Dresen, M.D.
and
Guy L. Kratzer, M.D., Allentown, Pa.

An increasingly large number of patients suffer from the various manifestations of fecal impaction. Proper management of the condition will prevent much suffering, many laparotomies, and even colostomies. Fecal impaction is defined as the presence in the rectum or colon of firm stercus which can be dislodged only with the aid of the finger, enemas, or operation. Organic causes include obstructing lesions, anal fissure, and diseases such as magacolon, general paresis, and infantile paralysis. Fecal impaction occurs at any age and can mimic other diseases by producing symptoms suggesting diarrhea, tumor, or urinary calculi. Physical examination may reveal a hard fecal mass in the rectum, a hard, putty-like mass at the end of the sigmoidoscope, distended abdomen, or palpable hard lumps in the abdomen. Impacted scybala in the lower part of the sigmoid may be dislodged by pelvic, abdominal, or sigmoidoscopic manipulation. Colonic irrigation is a pertinent form of therapy for suspected impactions higher in the colon. Two typical case histories are presented.

Experience has shown that some physicians do not regard fecal impaction as a common clinical entity with serious potentialities. Our data are obtained from a study of 500 consecutive patients suffering from fecal impaction. The problem is analogous to appendicitis or urinary obstruction and similarly requires prompt diagnosis and treatment. Proper management of fecal impaction will enhance the efforts of many who have pioneered in the prevention of unnecessary surgery. Much suffering, many laparotomies, and even colostomies may be avoided.

Information relating to this subject in the textbooks is incomplete. The common problems which plague patients must be considered. Physicians must be willing to examine and give the benefit of their experience to their patients. Problems of diagnosis cannot be delegated to the "other fellow"—the nurse or laboratory technician.

Constipation is a common ailment of mankind and since fecal impaction is a frequent sequela we believe that a didactic review substantiated with pertinent case histories and statistics is timely and imperative. The subject is important to both medical men and surgeons. If the surgeon fails to show sufficient awareness of this and other common ailments, those who believe that experience in general practice should be a requisite for specialty training have a point indeed.

Definition and Etiology

Definition.—Fecal impaction is defined as the presence of firm stool in the rectum or colon which can only be dislodged with the aid of the finger inserted in the rectum, with enemas, or with an operation. Its consistency may vary from putty-like to rock-like material. Although this is rare, we have seen fecaliths resembling billiard balls in both the small and large intestines causing intermittent intestinal obstruction and requiring operation for cure. Miniature fecaliths are frequently seen in the appendix and in diverticula (fig. 1).

The fecalith may consist simply of dehydrated stool or of a mixture containing other components, such as bulk laxatives, coriander seeds, drugs, or some other foreign body. Barium and bismuth have frequently been found in fecaliths.

In functional cases, fecal impaction causes an incomplete intestinal obstruction. In organic strictures of the intestine, fecal impaction may precipitate complete intestinal obstruction.

Etiology.—The causes of fecal impaction may be divided into functional and organic. Functional causes include dietary deficiencies, such as low-residue diet and insufficient food or liquids. The use of bulk laxatives, coriander seeds, or other foreign bodies in the diet may act as a nidus for the development of an impaction. Prolonged bed rest due to sickness or accident may be responsible. Patients taking large doses of antispasmodics have developed symptoms of intestinal obstruction and have been subjected to useless operations.

The organic causes include obstructing lesions, such as cancer, of the colon (fig. 2), rectum, and anus. Anal fissure or other similar painful diseases of the anorectal area may indirectly cause fecal impaction because the patient subconsciously delays bowel movement or incompletely empties the rectum and thus allows for the hardening of the stool over the course of days or months. The diseases, such as megacolon, paresis, and infantile paralysis, due to the nervous imbalance produce delayed emptying of the colon and, thereby, fecal impaction.

Resident in pathology (Dr. Dresen), and Chief, Proctology Department (Dr. Kratzer), Allentown Hospital.

Diagnosis and Treatment

Diagnosis.—Fecal impaction occurs at any age and can mimic other diseases by producing symptoms suggesting diarrhea, intestinal obstruction, tumors, megacolon, or urinary calculi. As in all diagnoses, the history is important. Oddly enough, patients with impaction in the rectum usually complain of diarrhea. This is usually because the impacted stool acts as a foreign body and the patient complains of frequent desire to empty the intestine. The impacted stool remains, but mucus, liquid stool, or even blood may be expelled at frequent intervals. The rectum may be so filled with stool that the patient does not have the strength to expel it completely but does expel a small amount each time. This is frequency from overflow. The situation is analogous to a distended bladder in which the patient voids at frequent intervals. The patient usually expels gas but cannot expel the offending stool. The patient may also complain of abdominal cramps and symptoms of complete or incomplete intestinal obstruction. The impacted stool may cause ulceration of the mucosa with massive hemorrhage. Physical examination may reveal a hard stool in the rectum, a hard, putty-like mass at the end of the sigmoidoscope, distended abdomen, or palpable hard lumps in the abdomen. A roentgenogram of the abdomen or a barium enema may be of help. One diagnostic help in digital or sigmoidoscopic examination is the fact that a fecal impaction usually can be dented with the finger or the scope. However, there are rare cases in which the fecalith is rock-like.

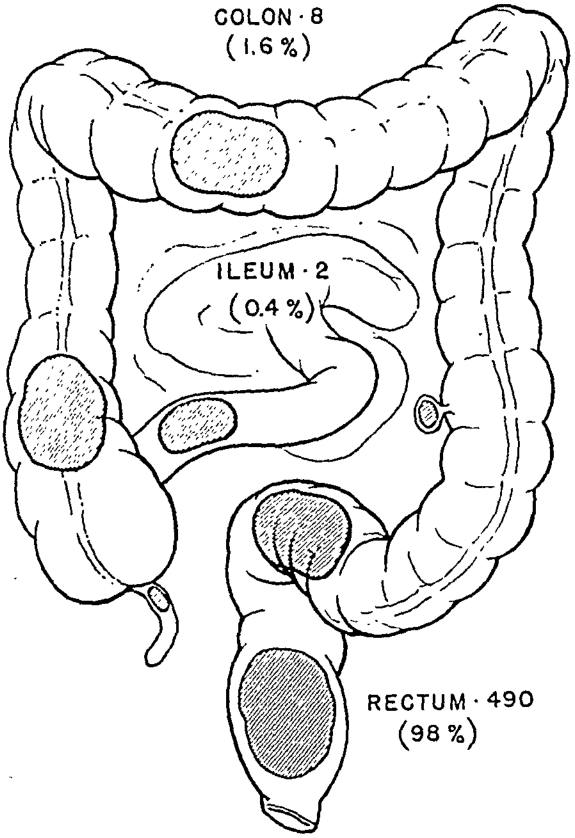

Fig. 1.—Location and frequency of fecal impactions.

Treatment.—Treatment is easy after the diagnosis is made. Impactions in the rectum can be broken or dislodged with the finger. Plain water enemas are helpful. Use of hydrogen peroxide has been discontinued because of the frequent sequela of proctitis. The patient should be in the knee-chest position, as water will not run uphill (fig. 3). Mineral oil instillations and enemas are used when the impaction is in the sigmoid or higher. The use of castor oil or similar laxatives by mouth in the presence of rock-like impacted stool in the rectum and colon is contraindicated because of the danger of precipitating complete obstruction, rupture of a diverticulum, or anorectal trauma. One must remember that in fecal impaction the intestine is partially obstructed and dilated. It is best to decompress it by means of enemas and continue this decompression for a number of days or until the intestine has regained its normal tone, after which an anticonstipation regimen with peristaltic stimulants may be used.

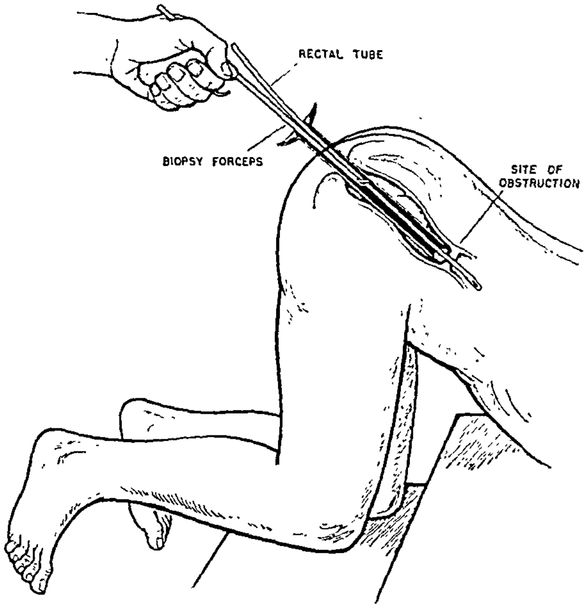

Fig. 2.—Method of inserting rectal tube beyond obstruction.

Fecal impactions in the lower part of the sigmoid may be dislodged by pelvic, abdominal, or sigmoidoscopic manipulation. For suspected impaction higher in the colon the colonic irrigation is a pertinent form of therapy, especially after an inconclusive barium enema or in the face of a poor surgical risk. The barium enema can always be repeated. The incidence of negative findings on exploration is high.

When impaction is associated with organic stricture of the anus, rectum, or colon, management must be modified accordingly. If the anus is contracted due to scar or other disease, it may be necessary to anesthetize the patient to enlarge the opening for proper examination and removal of the impaction. Frequently the anorectal pathology can be removed at the same time. This is particularly true in strictures and fissures. If the obstruction is at the rectosigmoid or higher and still within reach of the sigmoidoscope, a rectal tube can frequently be forced through the narrowed area and allowed to remain there until irrigations have allowed the imprisoned flatus and stool to escape, thus decompressing the colon and avoiding an emergency colostomy. Needless to say, one must be careful to avoid perforation of the colon. Good light and a long grasping forceps or wire mandrin are essential to the successful use of this maneuver.

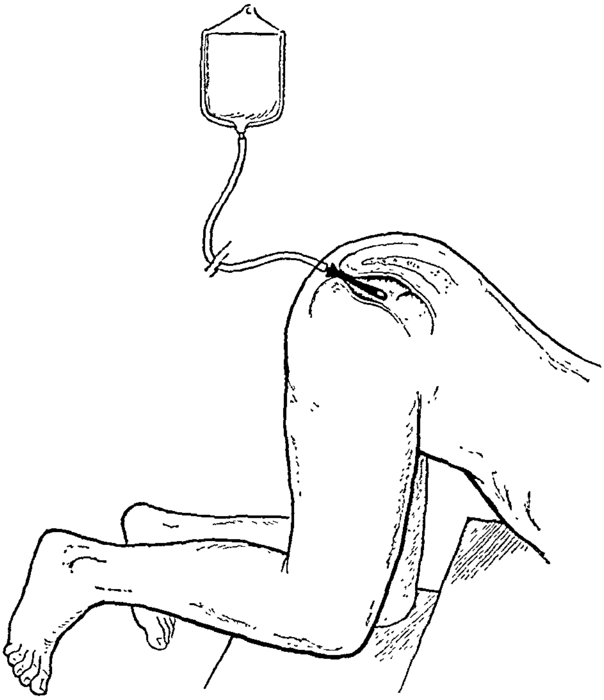

Fig. 3.—Knee-chest position for enema.

For organic strictures beyond the reach of the sigmoidoscope, surgical decompression is frequently necessary. However, colonic irrigations with the patient in the knee-chest position should be given a fair trial.

Report of Cases

Stimulus for this study was provided by an increasingly large number of patients suffering from the various manifestations of fecal impaction. Two illustrative case histories are accordingly summarized.

Case 1.—A man, aged 76, complained only of moderate constipation but sought medical care when a sudden massive amount of blood was expelled per rectum. Transfusion was necessary. Careful study, including sigmoidoscopy and x-ray of the colon, revealed only diverticulosis of the sigmoid colon. The patient was discharged but returned because of a fecal impaction in the rectum and recurrent hemorrhage. At laparotomy a large, partially obstructing mass was found at the ileocecal area. Hemicolectomy was performed, and the patient subsequently did well. The specimen showed a golf-ball-sized fecalith in the terminal ileum with localized ulceration and thickening of the intestine.

Case 2.—A woman, aged 67, presented another unusual problem. Hemorrhoidectomy had been performed,. and the patient had constant pain for three months after the operation. Due to language difficulties, the complaints were ill-defined. Frequent digital examinations failed to reveal anything wrong. The symptoms were considered to be due to nervous tension. Eventually, proctoscopic examination disclosed a fecal impaction containing a gauze square as a nidus, the removal of which resulted in dramatic relief.

Comment

Typical case histories relative to the unusual problems presented by fecal impactions beyond the reach of the examining finger have been presented. It is not necessary to cite cases of the usual impactions occurring low in the rectum. We must think of the possibility, insert the finger in the rectum, make the diagnosis, and institute proper therapy.

Fecal impaction occurs when firm stool in the intestine or rectum can only be removed with the aid of the finger, enemas, or an operation. No age group is exempt, and any portion of the intestine may be involved, although the rectum is the most frequent site.

Fecal impaction may be caused by organic diseases, such as obstructing cancers, fissures, anal strictures, megacolon, paresis, or infantile paralysis. Diagnosis may be made by evaluation of the symptoms of obstruction, tenesmus, bleeding, and "false diarrhea," supplemented by careful physical examination, including digital examination of the rectum and proctosigmoidoscopic examination. A roentgenogram of the abdomen and barium enema are important.

Treatment, in functional cases, consists chiefly of cleansing the rectum and lower part of the intestine by digital manipulation and enemas. In the presence of organic strictures of the anorectal area, anesthesia may be required for proper examination and treatment. In the presence of benign or organic strictures of the intestine, it may be possible to insert a rectal tube with the aid of a sigmoidoscope proximal to the narrow segment and thus decompress the intestine without resorting to emergency colostomy.

Diagnosis and treatment of this common disorder frequently requires some uncommon judgment and exercise on the part of the clinician, but such effort should result in many grateful patients and prevent unnecessary operations. Because of the paucity of information on fecal impaction in the textbooks, we consider this subject to be timely and pertinent.

1447 Hamilton St. (Dr. Kratzer).

WAYS AND MEANS TO REDUCE INFANT MORTALITY DUE TO SUFFOCATION

IMPORTANCE OF CHOANAL ATRESIA

Henry H. Beinfield, M.D., Brooklyn, N. Y.

Most newborn infants breathe through the nose and open the mouth only to cry or feed. The inhibition against mouth-breathing is sometimes so strong that obstructing the nose leads to suffocation. This is believed to account for some asphyxial deaths in newborn infants, since bilateral choanal atresia may exist. Even unilateral choanal atresia can be fatal if the remaining normal passage is temporarily obstructed. The diagnosis is made by measuring the depth to which a metal probe can be passed into the nose. A depth of less than 32 mm. (1¼ in.) means atresia; a depth of more than 44 mm. (1¾ in.) means patency. Data on the causes of neonatal asphyxial death will not be reliable until pediatricians include the choanal patency test in their regular procedure for the physical examination of infants, but it is believed that a perceptible reduction of the mortality from neonatal asphyxia can be achieved by keeping in mind the possibility of choanal atresia.

Surveys and investigations have been made by committees in an attempt to find out how the number of needless neonatal deaths can be reduced. Although the presence of congenital choanal atresia (atresia of the posterior nares) has never been considered in these reports, this factor should be included, for a proper evaluation, as one of the causes of infant suffocation. Choanal atresia, bilateral and unilateral, is seldom recognized as one of the causes of asphyxia in newborn babies and in infants up to 5 months of age who are found dead in their cribs or carriages, but more attention should be given to this condition if infant mortality is to be reduced.[1] As a significant finding in suffocation, it is also a serious public health problem.

Choanal atresia was definitely seen and described as early as 1830 by Otto[2] as a cause of infant suffocation, and there can be no question that it is still an important factor. Several writers[3] have reported during the last few years that a number of infants were saved from suffocation when this diagnosis was made and the condition immediately dealt with. Since such reports usually appear in a specialty journal, most physicians are not as familiar with this condition as they should be. The purpose of this paper is to stimulate a wider interest in the importance of choanal atresia in infant suffocation.

McKibben[3e] has described the history, incidence, embryologic development of the normal choana, theories of the causation of atresia, anatomy, associated anomalies, symptoms, diagnosis, and treatment along with an extensive bibliography. Medical students should be taught about this anomaly, but most courses in anatomy and pediatrics at present do not mention the existence of choanal atresia.

Mechanics of Suffocation

When both nostrils are completely obstructed because of bilateral atresia, the infant is unable to get any air into his lungs and dies of suffocation with, possibly, only a diagnosis of atelectasis being given. Clinically, this symptom complex, which is

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From the Department of Otolaryngology, Prospect Heights and Long Island College hospitals.

responsible for suffocation at birth, can be proved by pinching both nostrils of the newborn infant and watching the reaction. Signs of impending asphyxia will develop if the infant does not cry.

Unilateral atresia, which may occur up to 5 months of age, may be responsible when the infant is found dead in his crib or carriage. Although the contribution of this type of atresia to such deaths has not yet been substantiated by clinical study, I believe it is an important cause. The question is often asked, "Doesn't the infant open his mouth to get air to breathe, if he cannot breathe through his nose?" The answer is definitely "no." Thomson and Negus,[4] in 1937, stated that it is natural for an infant to breathe only through his nose. In other words, an infant will not normally open his mouth to breathe if he cannot breathe through his nose; as a matter of fact, he will close his mouth tighter in the effort of forced nasal breathing, cutting off the only other source of air, and will, therefore, suffocate. Thus, the normal and natural reflex, for adult or infant, is to breathe only through the nose, and mouth breathing is never normal at any age. Opening the mouth to breathe is purely a voluntary action, and infants up to 5 months of age do not usually have voluntary actions or movements. There are infants, however, who for some unknown reason breathe through the mouth at birth. Such an infant is an exception, however, and will not suffocate if he has bilateral choanal atresia. The anesthetist, pediatrician, and obstetrician as well as the general practitioner are, strangely enough, often unfamiliar with this reflex.

The mechanics of suffocation in an infant up to 5 months of age are as follows: First, an infant with bilateral complete nasal obstruction may suffocate at birth. Second, an infant with unilateral atresia or obstruction may suffocate at any time up to 5 months of age if conversion to bilateral obstruction occurs: When the mother places the baby on his abdomen, usually after he has been fed, with the side of the head or face so resting on the pillow or mattress as to close the airway of the clear or open nostril, complete bilateral obstruction may occur and the infant may suffocate.

Incidence

Infant mortality due to suffocation could be reduced if physicians were more aware of the possibility of choanal atresia. This congenital anomaly should be considered in all cases of asphyxia neonatorum; when it is recognized, proper measures should be immediately instituted to correct it.[4A] It is much more prevalent than one can imagine. The medical examiner and pathologist are frequently at a loss to explain the cause of death at autopsy in these cases because the nose is seldom examined or considered responsible for suffocation, with the result that the final report may state "cause unknown."[5]

No vital statistics agency in the United States lists atresia as a cause of death by suffocation. All such cases of suffocation are usually tabulated with atelectasis under the International List code number 762. I am informed that, to supply statistics on atresia, the report should specifically state "atresia" as cause of the suffocation or atelectasis.[6] The diagnosis of atresia can then be listed separately under the International List code number 759—congenital malformations of respiratory system—where it belongs. Autopsy is not done in many infants who die of suffocation, and, for the sake of completing the death certificate, pneumonia is often given as a cause.[7] This practice creates wrong statistics for pneumonia. Pathologists frequently report finding fulminating pneumonia as the only cause of death. In many cases, this could well be due to terminal changes and not to true pneumonia. Statistics furnished by the Health Department of the City of New York for 1951 showed that there were 162,755 live births, that 729 deaths were classified under International List code number 762 —postnatal asphyxia and atelectasis—and that, of these deaths, 389 (53%) were of infants under one day of age. No one knows how many deaths might have been due to choanal atresia, because the posterior nares were not examined at autopsy.

Anatomy, Diagnosis, and Treatment

Atresia of the nares at the junction of the hard and soft palate completely obstructs the passage of air through the nose. It may occur on one or both sides. The obstruction is usually of a completely bony nature, although it may be partly bony or only membranous. In the completely bony obstruction the nasal mucous membrane covers it in front and the pharyngeal mucous membrane covers it posteriorly. Embryologically, atresia is due to a failure of the buccopharyngeal membrane to open. Stupka[8] describes many types of atresia of the posterior nares. Other facial anomalies may be associated with this condition.[9]

Diagnosis.—In all cases of impending asphyxia, the anesthetist or the physician in charge of the newborn infant should immediately rule out bilateral choanal atresia. The difficulty in creating a clear airway may be found only in the nose. It is simple to make a diagnosis of choanal atresia. In the newborn infant, a metal probe should be passed into the nose until an obstruction is met. With the point on the probe carefully held where it meets the rim of the nostril, the probe is then removed. The distance is measured from the tip of the probe to the point held by the finger. If this distance measures 1¼ in. or less a diagnosis of choanal atresia can be made. If it measures 1¾ in., atresia is not present. If a no. 12 catheter cannot be passed into the pharynx, atresia can be suspected and confirmed by x-ray examination with the use of iodized oil (Lipiodol).

When unilateral atresia is suspected in infants up to 5 months of age, one may also try closing each nostril separately to determine which side of the nose is involved. If, after one nostril is closed, signs of suffocation appear, atresia of the opposite side of the nose should be suspected and checked. This test is of no value if the infant cries. When neither atelectasis nor other cause of death is apparent at autopsy, the pathologist or medical examiner should investigate the nose to determine if a congenital obstruction is present.

The only sign of bilateral atresia of the posterior nares is impending suffocation immediately after birth. One should watch for certain symptoms that could indicate unilateral choanal atresia to prevent unexpected and sudden death in infants up to 5 months of age. A thick, glairy mucus may be noted *persistently discharging from one nostril, or the* infant may have difficulty in breathing while nursing. The posterior nares should be examined in all such cases.

Treatment.—In a newborn infant with bilateral atresia in whom asphyxia is imminent, the mouth should be opened immediately and kept open with an anesthetist's infant-size airway.[4A] In this way the danger of anoxia can be overcome. The airway should be secured with adhesive tape strips placed across it and over the cheeks. This emergency procedure will save the life of the infant, and a nasal airway can later be established surgically. It is recommended that a clear nasal airway be obtained surgically within 24 to 48 hours after birth.[10] The airway in the mouth permits inhalation of enough air to barely sustain life; obviously, much more air is received through the nose when both nares are clear. Feeding is done by stomach tube or bottle. Sucking mucus out of the nose with a catheter or use of a resuscitator will not clear the nose if a complete obstruction is present.

When unilateral atresia is recognized, the mother should be warned against placing the infant down so as to close off the clear side of the nose. Operation for correction of unilateral atresia is not recommended during infancy. It is best to wait until the child is about 12 years of age or older, when a more satisfactory surgical procedure can be performed.[9]

Comment

It has been definitely established that bilateral choanal atresia is one of the causes responsible for suffocation of the newborn infant. The anesthetist or physician who is in charge of the infant immediately after delivery should first investigate the posterior nares in every case of impending asphyxia.

It has not yet been determined whether unilateral atresia is present or responsible for the sudden deaths of infants, but, in my belief, this could be an important factor. If a bilateral obstruction will cause suffocation, a unilateral obstruction due to atresia will produce the same result when, under favorable conditions, it is converted into a bilateral obstruction. This still remains a problem for further investigation and confirmation.

Pathologists and medical examiners seldom examine the nose for atresia in such cases to find the cause of death and often report "cause unknown." They could be of great help here by simply investigating the nares with a metal probe or catheter as one of the procedures in the autopsy examination.

I do not consider hydrocephalus, occasionally reported as a finding in these cases, as a congenital anomaly but rather as a complication, due to the spinal canal having been penetrated in the region between the atlas and the axis vertebrae as a result of improper surgery.[10]

A suggested plan to reduce infant mortality due to suffocation resulting from choanal atresia is as follows: 1. Federal, state, and local boards of health should inform every physician of the danger of choanal atresia. 2. Medical schools should teach the importance of this condition in courses on anatomy and pediatrics. 3. Committees investigating the reduction of neonatal deaths should include choanal atresia in their studies. 4. In every case of asphyxia neonatorum a notation should be made on the infant's chart that an examination for atresia of the posterior nares was made. 5. Every medical examiner and pathologist should examine the posterior nares in every newborn baby and infant up to 5 months of age when atelectasis is present or no other cause of death can be found. 6. When the cause of death by suffocation has been proved to be choanal atresia, it should be reported as such so that a proper tabulation of its incidence, which does not exist at present, can be made.

760 Eastern Parkway (13).

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DURATION OF SEROIMMUNITY AFTER INJECTION WITH ULTRAVIOLET-IRRADIATED POLIOMYELITIS VACCINE

ROLE OF BOOSTER INOCULATIONS

Albert M. Wolf, M.D., Howard J. Shaughnessy, Ph.D., Martha Janota, M.S., James W. Chapman, M.D.
Ruth E. Church, M.D.
and
Mildred Moore, B.A., Chicago

The degree and duration of immunity induced by injections of killed poliomyelitis vaccine were studied in 4,000 children. A smaller serologically negative group received special study. Antibody titers were measured before and after the primary immunization, before and after the first booster injection, and before and after the second booster injection. The average immune status was raised by the primary vaccination, but it declined during the ensuing year, was raised to a higher level by the first booster, declined less thereafter, and reached its highest level after the second booster. The response to type 2 antigen was better than the responses to types 1 and 3. There were indications that the commercial vaccine used in the later phases of the study was more potent than the experimental vaccine used in the beginning. The authors recommend that the primary series of three injections of ultraviolet-irradiated formalin-treated poliomyelitis vaccine be followed by at least one and possibly two booster injections at yearly intervals.

Additional information is needed concerning the duration of immunity from vaccination with killed virus poliomyelitis vaccine. Probably some years must elapse before a final answer can be obtained, but in the meantime it appears that studies of the persistence of poliomyelitis antibodies after primary immunization and booster inoculations may be an index of the durability of immunity. It is realized that possession of antibodies against poliomyelitis and real immunity against the paralytic disease may be two different phenomena, but it is generally assumed that the two are significantly correlated. There have been numerous studies on antibody response after vaccination, but only a few studies have been reported on the duration of seroimmunity after vaccination; among them are those by Salk,[1] Armstrong and associates,[2] and Brown and co-workers.[3]

In previous reports,[4] our group showed that (*a*) a combination of ultraviolet irradiation and mild heat consistently inactivated all three types of poliomyelitis virus derived from monkey tissue culture and (*b*) the resultant poliomyelitis vaccine was safe and evoked significant antibody formation in children. These experimental vaccines were used to inoculate some 4,000 children in Morgan County, Ill., in an investigation made in cooperation with the Illinois Department of Public Health and the Morgan County Health Department. One of the principal reasons for the selection of this area was the low incidence of poliomyelitis over a period of years previous to the study. These children have been observed for two to five years after immuni-

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From the Michael Reese Research Foundation; the Illinois Department of Public Health; the Morgan County (Ill.) Health Department; and the Department of Public Health, University of Illinois College of Medicine.

zation; none has developed poliomyelitis. The group is small, and there has been very little poliomyelitis in Morgan County or nearby during the period of observation; hence, no definite deductions can be made concerning clinical immunity.

More definite deductions regarding duration of immunity may be based on serial studies of poliomyelitis antibodies in the serums of immunized children. Our limited facilities precluded testing of all of the immunized children for antibody responses. By preliminary screening we selected children who were largely lacking in antibodies and concentrated on this picked group for further study. It is possible that some of these children may have had antibodies not demonstrable at the time of inclusion in the study. Obviously, this reservation applies to all studies by all methods and perhaps explains the effectiveness on occasion of a single injection. There was a progressive decrease in the size of the study group over the period of the study, so that results were not always obtainable on exactly the children from whom they were desired. These later groups were from the original intensive study group, and the only selection was based on the willingness of the parents to have blood samples taken and reinjection done.

Table 1.—*Antibody Titers Against Poliomyelitis*

		No. of Children					
Against	Titration Level	Preimmunization	After Primary Injection	Prebooster 1 (12-36 Mo. Later)	Postbooster 1	Prebooster 2 (12-24 Mo. Later)	Postbooster 2
Type 1	2,018	1	0	0	0	0	0
	1,024	0	0	0	6	4	4
	512	0	0	0	6	2	2
	256	0	5	2	14	3	3
	128	0	1	1	3	3	3
	64	3	8	7	14	11	1
	32	0	13	0	2	0	0
	16	1	14	9	20	6	0
	8	1	12	4	5	6	0
	4	1	17	16	5	13	0
	2.	0	0	0	0	1	0
	1	2	22	27	5	23	0
	0	96	12	33	1	5	0
Type 2	2,048	0	0	1	0	0	0
	1,024	0	2	2	12	0	1
	512	0	4	3	8	1	4
	256	2	7	5	31	3	6
	128	2	6	2	7	3	0
	64	4	10	15	19	10	2
	32	1	19	5	1	9	0
	16	3	36	25	3	16	0
	8	0	7	12	0	7	0
	4	5	8	13	0	5	0
	2	0	0	0	0	0	0
	1	3	5	13	0	2	0
	0	83	0	2	0	0	0
Type 3	2,018	0	0	0	0	0	0
	1,024	1	3	3	3	0	2
	512	0	1	0	3	0	1
	256	1	11	1	17	1	5
	128	0	3	1	5	2	2
	64	3	3	9	16	3	1
	32	4	3	2	4	4	1
	16	4	6	10	8	6	0
	8	0	6	2	6	3	0
	4	3	20	12	5	8	0
	2	0	0	0	1	0	0
	1	1	30	30	8	22	0
	0	88	18	27	5	8	1

Methods

All injections were with our experimental vaccine except as will be noted. Screen assays of antibodies were performed by the roller tube method throughout. It is recognized that this method gives titers less than those shown by metabolic inhibition, probably in a ratio of approximately one to four.[4a] Sabin[5] has indicated that antibodies demonstrated by the cytopathogenic test in roller tubes have higher avidity than those demonstrated by metabolic inhibition. He has also shown that antibodies of the high avidity type are developed as a result of natural infection and are, therefore, presumably a good index of real immunity.

Children in the group analyzed here were tested for antibodies (*a*) before primary immunization of three injections at 1-to-14-day intervals; (*b*) after primary immunization at 7 to 30 days after the third injection; (*c*) immediately before our first booster 12 to 36 months after primary injection; (*d*) about 7 to 21 days after first booster injection; (*e*) immediately before the second booster at 12 to 24 months after the first booster; and (*f*) about 7 to 21 days after the second booster.

Results

Specific titers are shown in table 1 and summarized in table 2. Certain findings are outstanding. The response to the type 2 component of the vaccine is relatively greater than to the type 1 and type 3 components. Of 83 children lacking antitype 2 antibodies initially, all showed such antibodies after the primary injection and 82 showed such antibodies in all tests thereafter, while one produced antibodies after the primary injection but seemed to lack them before the first booster injection; this child responded well to the booster injection and showed antitype 2 antibodies in all subsequent tests. Thus, immunity generated by the type 2 component

Table 2.—*Antibodies Against Poliomyelitis*

		Negative Against Type						Mean Titer, Type		
		1		2		3				
	No. of Children	No.	%	No.	%	No.	%	1	2	3
Preprimary injections.	105	96	92	83	80	88	84	6	7	10
Postprimary injections	105	12	12	0	0	18	17	48	82	72
Prebooster 1 (12-36 mo. later).....	96	33	34	1	1	27	28	12	73	42
Postbooster 1	80	1	1	0	0	5	6	182	328	147
Prebooster 2 (12-24 mo. later)	56	5	9	0	0	8	14	13	50	17
Postbooster 2	14	0	0	0	0	1	7	487	364	243

of the experimental vaccines used may be considered in excess of 98%. In contrast, the responses to the type 1 and type 3 components of the experimental vaccines were less but still quite good. The incidence of those lacking antitype 1 antibodies (negatives) was 92% preimmunization but fell to 12% after the primary injection, had risen to 34% at the prebooster testing some 12 to 36 months later, dropped to 1% after the first booster injection, and had again risen but only to 9% at testing before the second booster injection 12 to 24 months later. All children tested after the second booster injection showed antitype 1 antibodies. Data for the type 3 component are similar to those for type 1. Thus, with our experimental vaccines the immunity generated against type 1 and type 3 poliomyelitis virus seemed to be weaker with lower titers and a tendency was seen for the antibody levels to fall below the threshold of our test method and return to zero level.

From general immunological considerations it seems likely that poliomyelitis antibodies once produced are present for life, although, perhaps, at very low levels, and that the host will display a rapid anamnestic reaction to either booster injection or actual virus exposure. Thus, the host who has once shown antibodies is probably clinically immune. Nevertheless, a persistence of demonstrable antibodies like those demonstrated against type 2 is to be preferred.

The value of a first booster injection is clear, and the immune status after the first booster is better than after the primary injection in the following comparisons: (*a*) the percentage of negative responses is less; (*b*) the average titer is higher; and (*c*) the persistence of demonstrable antibodies is better.

The improvement created by the first booster leaves a fairly satisfactory status of 86 to 100% serologic immunity; additional booster injections seem less important, although obviously they would tend to improve the average immune status.

In the latter part of this study, as our own experimental vaccines ceased to be available, use was made of a commercial poliomyelitis vaccine prepared by a combination of ultraviolet irradiation and dilute formalin. The use of this vaccine for the first booster injection in 26 children among those tested after the first booster permits comparison with the remaining 54 who received booster injections of our experimental material. The comparison is altogether favorable to the later-produced commercial product. All children receiving booster injections with this material showed demonstrable antibodies against all three types when tested after the booster injection and the average titers were higher in a ratio of eight to one (type 1), two to one (type 2), and two to one (type 3).

Comment

The durability of seroimmunity to poliomyelitis after vaccination with ultraviolet-irradiated vaccines has been studied for two to five years during which time some children received one and others two postbooster inoculations. In most instances the children had received their three initial injections of vaccine so close together that it is probable that what we are calling the first postbooster dose might in other time schedules be called the final dose of the primary series. Seroimmunity followed exactly the pattern that might have been expected. There was a good response after the primary series which fell off somewhat during the next 12 to 36 months; after a first booster injection the antibody levels reached a higher level and fell less than after the primary immunization; after a second booster there was an even better response to even higher titers. As in previous studies by others and by ourselves, the responses to types 1 and 3 antigens were not as good as to type 2. Possibly the latter is a better antigen or the response to it is conditioned by prior experience to a greater extent than is true of the other two antigens. The evidence from this study suggests the desirability of at least one and possibly two booster injections at yearly intervals.

530 E. 31st St. (16) (Dr. Wolf).

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FAMILIAL PERIODIC DISEASE WITH RENAL DAMAGE

Israel Alkalay, M.D., Maxim Shenfield, M.D.
and
Emmanuel Levy, M.D., Ph.D., Affula, Israel

A 16-year-old boy was hospitalized with symptoms and signs of acute glomerulonephritis. He had suffered since childhood from recurring attacks of fever with abdominal pain and rigidity. Treatment with various antibiotics was unavailing. Anemia increased and renal failure progressed until death, and autopsy disclosed an appendectomy scar, general amyloidosis of the secondary type, terminal pericarditis, and bronchopneumonia. The father and one brother of the patient had each undergone appendectomy for similar recurrent episodes of abdominal pain, and another brother had a similar history but without appendectomy. A fourth brother was healthy, as was the mother. It is believed that the four cases described were instances of familial periodic disease or recurrent polyserositis and that this possibility should be kept in mind in patients with symptoms of either nephritis or appendicitis.

The disease described by Reimann[1] and termed by him "periodic disease" has been increasingly recognized and reported in Israel, although different names are sometimes applied. Heller and associates called it familial Mediterranean fever,[2] and Rachmilewitz and associates termed it recurrent polyserositis.[3] These studies, along with those of Reimann[4] and Mamou,[5] may be regarded as having established the independent existence of this disease beyond question. It is interesting that all the patients have their origin in Mediterranean countries and the majority are Jews, Armenians, and Arabs, with a few patients among Turks and Italians. A few reports have described patients in whom renal damage was present (Mamou and Cattan,[6] Heller and co-workers,[2] and Shapira[7]). Mamou and Cattan[6] in particular stressed the importance of renal involvement in periodic disease and described a family in which six members suffered from periodic disease, three of whom died from uremia.

The present communication concerns a Jewish family from Spanish Morocco, four members of which were known to suffer from periodic disease, and all of whom showed signs of renal damage, one having died in the terminal stages of renal failure; the postmortem findings of the latter are included in this report. The family in question consisted of a father and four sons, all except the youngest son having been admitted to hospital for the purpose of this study.

Report of Cases

CASE 1.—In January, 1957, a 16-year-old boy from Spanish Morocco was admitted with a tentative diagnosis of acute glomerulonephritis. Two weeks prior to admission he had suffered from an attack of tonsillitis which had been followed a few days later by swelling of the ankles and eyelids. He gave a history of suffering since childhood from recurring irregular attacks of abdominal pain lasting one day, during which the abdomen became "as hard as a stone"; between attacks he felt well. At the age of 10 years appendectomy was performed, but the attacks continued as previously. Examination revealed edema of the eyelids and ankles. The blood pressure was 140-150/100 mm. Hg. A systolic murmur was heard over the apex. The spleen was palpable to 6 cm. below the costal margin. The liver was not palpable. The laboratory findings were as follows: hemoglobin level, 10 Gm. per 100 ml.; red blood cell count, 3,650,000 per cubic millimeter; white blood cell count, 15,000 per cubic millimeter; total protein level, 4.5 Gm. per 100 ml.; albumin level, 1.7 Gm. per 100 ml.; globulin level, 2.8 Gm. per 100 ml.; blood cholesterol level, 230 mg. per 100 ml.; urea level, 100 mg. per 100 ml. The Congo red test showed 33% retention in blood; blood sedimentation rate (Westergren method) was 140 mm. the first hour and 150 mm. the second hour; the results of the blood potassium, sodium, chloride, carbon dioxide–combining power, and uric acid tests were within normal limits. Examination of the urine showed albuminuria with moderate numbers of white blood cells, red blood cells, and casts.

During the first few weeks of his stay in hospital, a low-grade pyrexia continued despite the administration of various antibiotics. Blood culture and serologic reactions were negative. The antistreptolysin titer was 128 units. The temperature slowly returned to normal, there being attacks of fever and abdominal pain lasting for only one day on the 64th, 72nd, and 81st days of hospitalization. Diastase and porphyrobilinogen were not found in the urine. The patient was admitted again in June, 1957, when the main finding was more severe anemia (red blood cell count, 2,760,000 per cubic millimeter). At the last admission, January, 1958, there was increasing anemia and progressive renal

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From the Department of Internal Medicine and the Institute of Pathology, Central Emek Hospital, Kupat Holim.

failure (blood urea level, 369 mg. per 100 ml. and uric acid level, 11.6 mg. per 100 ml.) until death.

Postmortem Findings.—At autopsy well-marked emaciation and pallor were present. On the front of the trunk and extensor surfaces of the limbs a skin eruption was to be seen. There was an old operation scar in the right iliac fossa. Both pleural cavities showed marked adhesions, particularly at the lung bases; there was no fluid. The larynx and trachea were normal. The bronchi contained frothy mucus. The lungs weighed 1,300 Gm. and showed generalized edema with bronchopneumonic changes in both bases, with some petechial hemorrhages on the outer surfaces. The pericardial sac contained an excess of straw-colored fluid. The outer surface of the heart showed fresh pericarditis. The heart weighed 300 Gm. and showed no other special features. The spleen weighed 340 Gm. and was enlarged and firm. Apart from a few petechial hemorrhages in the mucosa of the stomach, no special features were noted in the gastrointestinal tract; the appendix was absent. The liver weighed 2,120 Gm. and was enlarged and pale.

The kidneys appeared small, the combined weight being 150 Gm. The capsules stripped fairly easily, with few adhesions. The cut surfaces showed marked pallor with some blurring of the corticomedullary markings. The remainder of the genitourinary system showed no special features. The brain weighed 1,480 Gm. and showed edema but no other special features macroscopically. The pituitary, thyroid, and adrenal glands appeared normal. Marked diffuse amyloidosis was found in the kidneys, spleen, and adrenal glands, but not in the liver; the amyloid material gave the typical staining reactions of so-called secondary amyloidosis. The skin showed the changes of nonspecific dermatitis. The remaining tissues and organs showed no special features. The findings were summarized as showing generalized amyloidosis of secondary type with terminal pericarditis and bronchopneumonia.

Case 2.—The father, aged 47 years, also gave a history of attacks of severe abdominal pain from childhood, the pain lasting from 24 to 48 hours and accompanied by temperatures up to 101 F (38.3 C). Between attacks of pain he felt well and did hard physical work. At the age of 12 years appendectomy was performed, with no influence on subsequent attacks. At the age of 20 years he suffered from gonorrhea, and at this time examination revealed albuminuria. He could remember only one year when he was completely free from pain. At the time of admission, the attacks of abdominal pain had been occurring every 13 to 20 days, accompanied by pyrexia up to 102 F (39 C). The condition of eight siblings was unknown; however, he stated that his father, who died at the age of 63 years, also had suffered from attacks of abdominal pain every one or two weeks, the pain lasting one to two days.

Physical examination revealed no special findings. Examination of the urine showed specific gravity to be 1.008, 1 to 2 leukocytes and erythrocytes per high-power field, and occasional hyaline and granular casts. Urea clearance was 66% of normal. Examination of the fundus oculi was reported as follows by Dr. Sachs: "Dark red macula around which are white areas of retinal ischemia due to obstruction of the choroidal capillaries, and in addition marked Gun signs." During his stay in hospital, one attack of abdominal pain was witnessed, accompanied by pyrexia up to 102 F and leukocytosis (with an increase in leukocytes from 6,450 to 9,600 per cubic millimeter).

During the attack, examination of urine for porphyrobilinogen was negative. All signs of the attack disappeared after 24 hours. X-rays of the chest, stomach, gallbladder, and urinary tract showed no abnormal findings. Blood chemical examinations were negative (levels of urea, uric acid, creatinin, cholesterol, and proteins were all within normal limits). The findings were summarized as showing periodic disease with slight renal damage.

Case 3.—The 12-year-old son, from the age of 9 years, had suffered from attacks of severe abdominal pain every 8 to 20 days, accompanied sometimes by pain in the extremities and with pyrexia up to 102 F. He was admitted to hospital in Morocco at the age of 9 years because of suspected nephritis. Appendectomy was performed at the age of 10 years, but the mother related that the surgeon had informed her that the appendix was not inflamed. The attacks of pain reappeared six months after the operation and recurred to the time of admission, each attack lasting up to 24 hours; between attacks he felt well.

There were no abnormal findings on physical examination. Blood pressure was 110/70 mm. Hg. During an attack the blood sedimentation rate (Westergren method) was 34 mm. the first hour and 75 mm. the second hour. The only abnormal findings were in the urine, examination of which showed a specific gravity of 1.016, traces of albumin, and occasional erythrocytes and leukocytes in each microscopic field. Liver function tests were normal. X-rays of the chest, gallbladder, and urinary tract were normal. Examination of the fundus oculi showed a normal appearance. A typical attack of abdominal pain was witnessed, accompanied by pyrexia up to 101 F and leukocytosis, with 16,000 leukocytes per cubic millimeter. All the signs disappeared the next day. During the attack, examination of the urine was negative for porphyrobilinogen. The findings were summarized as being those of periodic disease with slight albuminuria.

Case 4.—Another son also suffered from the age of 5 years from attacks of abdominal pain every 8 to 10 days, accompanied by pyrexia up to 102 F;

the attacks usually subsided in 6 to 12 hours with administration of analgesics. From the age of 9 years the abdominal attacks ceased, but since then he has had attacks of pain in the chest, mainly on the right side. Six months before his admission he had an attack of angina followed two weeks later by edema of the eyelids and ankles. The results of urine examination are not available. Clinical examination was normal. Blood pressure was 130/80 mm. Hg. The urine showed traces of albumin, with leukocytes and occasional red blood cells in each microscopic field. Other laboratory findings were normal. X-rays of the chest, stomach, gallbladder, and urinary tract were normal. The fundi oculi were normal. The findings were summarized as showing periodic disease characterized by abdominal pain in early childhood which has been replaced by stethalgia; slight urinary abnormalities were also present.

The fourth son, 7 years of age, has been healthy apart from the usual childhood illnesses, and there is no present evidence of periodic disease. The mother of the family is healthy, and there is no blood relationship between her and her husband, the father of the family.

Comment

Four members of one family suffered from periodic disease and showed evidence of renal damage; one of these died in renal failure and postmortem examination revealed the presence of amyloidosis. In this patient there was an episode of acute glomerulonephritis about a year before death. Although some authors describe the possibility of various forms of nephritis, including acute nephritis, occurring in periodic disease (Mamou [5] and Benhamou and associates [8]), it is probable that in the patient described the attack of acute nephritis was superimposed on the basic condition.

The family history suggests the possibility of hereditary transmission as a dominant factor; this is in agreement with the view put forward by Heller and associates.[2b]

It is considered that the renal damage is an important and frequent sign of periodic disease, as stressed by Mamou and Cattan [6] and confirmed by Heller and associates,[2b] and this complication affects the prognosis which was formerly considered to be benign. It is not clear whether the renal damage is an integral part of the disease or should be regarded as a complication to which these patients are more prone. In any case it is important that the possibility of periodic disease should be considered in every case of obscure nephritis.

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CHRONIC HYPOVENTILATION IN THE OBESE PATIENT.—The symptoms and signs due to the hypoventilation syndrome in the obese individual develop insidiously, and frequently have been present for a long time without patient or relatives realizing their presence. The obese patient who is hypoventilating might therefore be likened to the myxoedematous individual. In both, the insidious nature of the development of the signs and symptoms and the resulting dulling of the sensorium, and possibly confusion, frequently delay the initial visit to the physician for medical attention. The insidiousness of this syndrome is pointed out by the fact that it was only in retrospect that the family volunteered a history of headache and progressive fatigue.

Thus it can be seen that even in the absence of obvious clinical lung or heart disease, the obese individual may be suffering from deleterious effects on the respiratory and haematological systems, which in turn may affect the sensorium and produce neurological signs. These far-reaching effects of obesity emphasize and underline the preventive and therapeutic implications of excessive weight, with or without pulmonary disease.—Reuben M. Cherniack, M.D., Respiratory Effects of Obesity, *The Canadian Medical Association Journal*, April 15, 1959.

MANAGEMENT OF ARTERIOSCLEROSIS OBLITERANS OF THE EXTREMITIES

Fay A. LeFevre, M.D., Cahid Corbacioglu, M.D., Alfred W. Humphries, M.D.
and
Victor G. deWolfe, M.D., Cleveland

The most common vascular disease that involves the extremities is arteriosclerosis obliterans. It occurs most frequently during the fourth, fifth, or sixth decade of life and may disable its victim at the peak of his career, thus making treatment a matter of utmost importance.

Although angiography has been a well-established technical procedure for several years,[1] its clinical application in diagnosis and prognosis has become important only fairly recently, concomitant with the development of successful techniques for arterial grafting. These two procedures, angiography and arterial grafting, have altered the treatment of peripheral arterial disease to the extent that currently a decision must be made in each case as to whether or not the patient is a suitable candidate for arterial grafting. To assist the clinician in making this decision, knowledge of the natural course of the disease is most valuable. In this report we shall discuss the diagnosis and natural course of arteriosclerosis obliterans, outline the diagnostic criteria for selecting patients for angiography and for arterial grafting, and summarize our results of this type of surgical treatment for arteriosclerosis obliterans.

A follow-up study of 500 patients with arteriosclerosis obliterans indicates that approximately 75% show little progression of the disease over a five-year period. Angiography is the only method that demonstrates the segmental type of occlusion. All patients with severe ischemia, with or without gangrene, should have the benefit of angiographic study to determine the feasibility of arterial grafting, which may be the preferred treatment. Morbidity in patients undergoing arteriography has been 0.1%, with no deaths. The effect of sympathectomy on the progress of arteriosclerosis obliterans is difficult to determine.

Diagnosis of Arteriosclerosis Obliterans

The diagnosis of arteriosclerosis obliterans can be readily established by evaluation of the history and physical findings on examination. As a rule, special studies such as temperature and oscillometric recordings are not essential. The most common symptom is intermittent claudication, usually described as a cramp-like pain related to walking or to exercise (fig. 1). Claudication may occur at any level in the lower extremities, depending on the site of the arterial obstruction (fig. 2). Arteriosclerosis obliterans is a common though frequently overlooked cause of low back pain related to obstruction of the abdominal aorta or of the common iliac arteries. If claudication is present the chief physical finding will be reduced or absent peripheral pulsations. Pulse changes can be readily detected by palpation at the usual levels and are related to the level and extent of obstruction. In addition, patients may or may not experience coldness of the extremities and show evidence of trophic changes. These features are related to the rate of progress of the disease and to the extent of development of collateral circulation.

A positive diagnosis of arteriosclerosis obliterans, therefore, can be made in most cases from a typical history of intermittent claudication along with the clinical finding of abnormally low or absent peripheral pulses.

Although thromboangiitis obliterans and problems of acute arterial occlusion resulting from embolism may give rise to similar findings, they are seen infrequently, and the features of differential diagnosis have been well documented.[2]

Natural History and Progression of Arteriosclerosis Obliterans

The evaluation of any medical problem is aided considerably by an understanding of the prognosis or possible progression of the disease. This is especially true of arteriosclerosis obliterans.

In 1940 Hines and Barker[3] reported a study of 280 cases of arteriosclerosis obliterans. Of 116 patients adequately followed up 54.6% died within the first three years. Of the 280 patients 70 underwent amputation. Massarelli and Estes,[4] in an eight-year follow-up study of patients who had arteriosclerosis of the abdominal aorta and the iliac arteries, disclosed survival rates of 47% at the end of the fifth year and 18% at the end of the eighth year. They also reported that of the 57 patients

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From the departments of cardiovascular disease and vascular surgery, The Cleveland Clinic Foundation, and The Frank E. Bunts Educational Institute. Dr. Corbacioglu is a Special Fellow in the Department of Cardiovascular Disease.

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followed up for two years 79% had no progression of the disease. Silbert and Zazeela[5] observed the course in 1,198 patients with arteriosclerosis obliterans and reported in detail the prognosis in those patients. Beckwith and co-workers[6] made a six-year follow-up study of 65 patients with aortoiliac thrombosis, 22 of whom died while under observation; death usually was related to disease of the renal, coronary, or cerebral arteries.

Our study is based on the records of 500 consecutive patients with arteriosclerosis obliterans seen at the Cleveland Clinic from 1950 through 1952, providing a minimal follow-up evaluation period of five years. The average age of the patients when first examined was 60 years; 20.2% were women and 79.8% were men. All of the cases satisfied the clinical criteria for diagnosis as outlined above. The sites of the disease were the abdominal aorta and the peripheral arteries of the lower extremities. Patients with aneurysm were not included in this series. The period in which these patients were seen predated the advent of arterial grafting at the Cleveland Clinic; 86 of the patients underwent sympathectomy. All of the patients were instructed in the general care of the limbs and were advised to refrain from the use of tobacco. Diabetic patients were given special instructions.

The five-year survival rate after the time of diagnosis is graphed in figure 3. As might be expected, the survival rate of the nondiabetic group (59.0%) is slightly higher than that of the diabetic group (52.7%), with the five-year survival rate of the total group being 57.3%. However, the presence of diabetes appeared to be of less importance in relation to five-year survival than the presence of arteriosclerosis involving other systems, chiefly cerebral and cardiac. This correlation is shown in figure 4. There was survival of 65.6% of patients who had no clinical evidence of arteriosclerosis elsewhere and 48.0% of patients who had evidence of arteriosclerosis elsewhere. The incidence of diabetes was essentially the same in these two groups. Of the total of 500 patients 212 (42.4%) had cardiac or cerebral involvement. Of these 67 were diabetic, or 47.5% of 141 diabetic patients in the series, and 145 were nondiabetic, 40.3% of 359 nondiabetic patients.

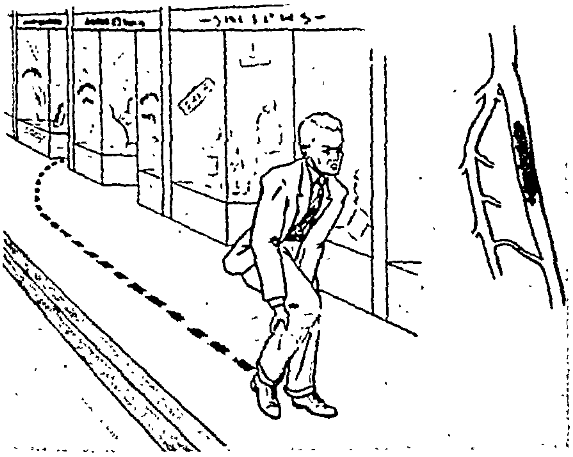

Fig. 1.—Intermittent claudication at calf level because of occlusion of superficial femoral artery (*right*).

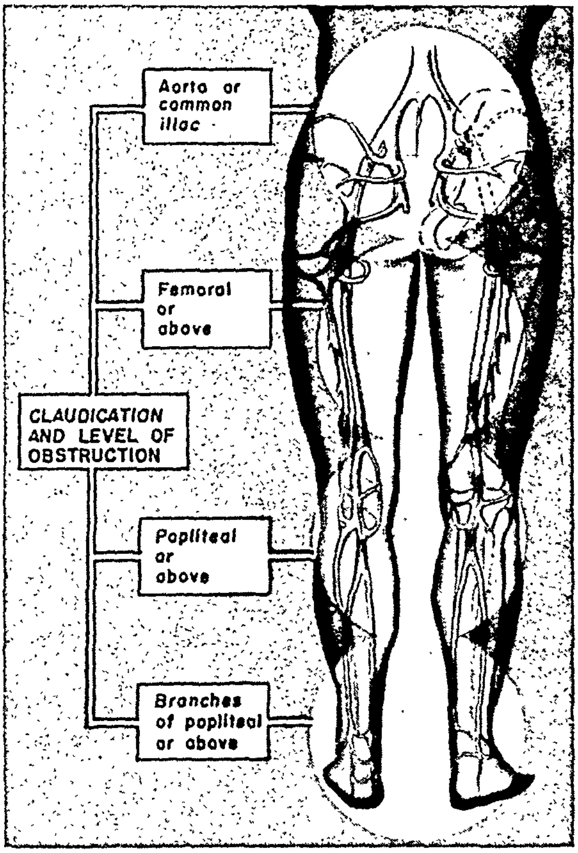
Aorta or common iliac
Femoral or above
CLAUDICATION AND LEVEL OF OBSTRUCTION
Popliteal or above
Branches of popliteal or above

Fig. 2.—Relation of level of arterial obstruction to site of claudication.

In our total series, adequate follow-up by clinical evaluation was obtained in 185 cases. The degree of progress was determined and classified as shown in table 1.

The effect of sympathectomy on the progress of the disease and its relation to the incidence of amputation is difficult to determine. This is in part due to the fact that patients undergoing sympathectomies were in general the critically ill patients with advanced disease. In our series of 185 patients 37 (20%) underwent sympathectomy, of whom 12 (32.4%) improved, 10 (27.1%) remained the same, and 15 (40.5%) continued to become worse. The relationship of sympathectomy to diabetes is shown in table 2. Although there were fewer diabetic than nondiabetic patients in this series 60% of the diabetic patients became worse after sympathectomy, as compared to 33.3% of the nondiabetic patients.

The incidence of amputation in the total series of 185 patients was 11.9% (20.7% of the diabetic and 8.3% of the nondiabetic patients). Plasma cholesterol determinations were made for 130 patients. The average value was 236 mg. per 100 ml., the range being from 113 to 580 mg. per 100 ml. There appeared to be no correlation between the plasma cholesterol level and the degree or progress of the disease.

Table 1.—*Five-Year Follow-up Study of 185 Patients with Arteriosclerosis Obliterans*

Condition	Total Patients		Nondiabetic Patients		Diabetic Patients	
	No.	%	No.	%	No.	%
Improved	48	25.9	40	30.3	8	15
Unchanged	90	48.6	62	47.0	28	53
Worse	47	25.4	30	22.7	17	32
Total	185	100.0	132	100.0	53	100

Selection of Patients for Angiography

From the above analysis of the natural progression of arteriosclerosis obliterans it is clear that 75% of the patients studied either remained the same or improved during a five-year period. This would indicate that in about one patient in four the disease progresses to the extent that measures other than conservative ones are required in order to prevent or retard the necessity for amputation. If, in this group, the presence of segmental arteriosclerosis obliterans can be determined, it may be possible to reestablish circulation by arterial grafting. The following three groupings were used to select patients for angiography, the only means by which the presence of a segmental occlusion can be determined.

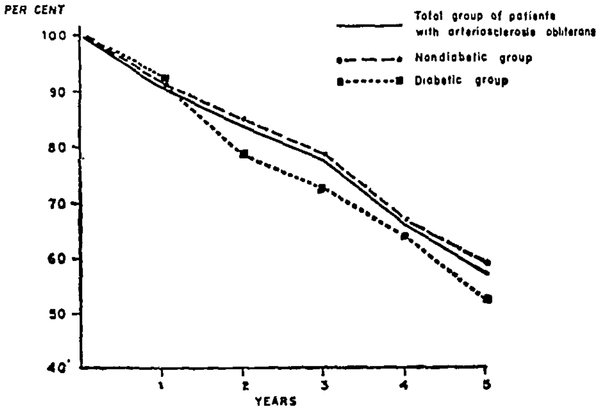

Fig. 3.—Five-year survival rate of 500 patients with arteriosclerosis obliterans, with comparison of diabetic and nondiabetic groups.

Group 1.—Patients Without Progressive Intermittent Claudication but Who Consider Themselves Disabled.—From time to time we see relatively young patients who have claudication after walking for one or two blocks. Even though the disease has been symptomatically stationary, they are unable to carry on their business duties and social activities because of their limitations in walking. Patients in this category may well deserve further investigation by angiography.

Group 2.—Patients With Progressive Intermittent Claudication With or Without Good Nutrition of the Limbs.—Regardless of the nutrition of the affected extremity progressive claudication indicates advancing disease. The necessity for angiography depends on the speed of the progression, and each case must be assessed individually. Some patients show rapid progression during the first few months after the onset of symptoms. They may then show no progression, however, because of formation of collateral circulation. In the patient with slow advancement it may be good judgment for the physician to observe the patient at monthly intervals, with the understanding that he must see the patient at once if there is a more rapid or radical change. In patients who have continued rapidly advancing disease, however, acute thrombotic occlusion may develop, and these patients should be considered candidates for early angiography. In such cases, if the occlusion is caused by segmental disease, acute ischemia of the limb may be prevented by early arterial grafting.

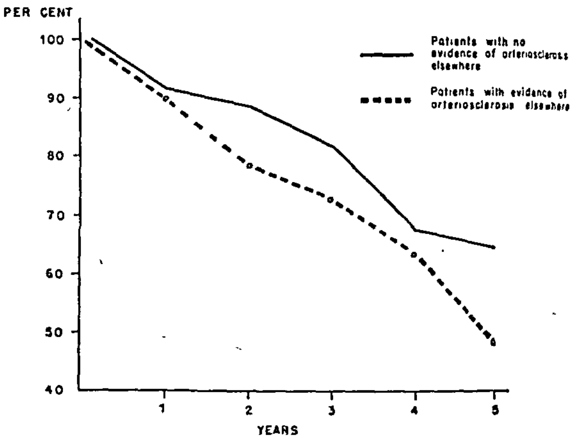

Fig. 4.—Five-year survival rate with comparison of patients having no evidence of arteriosclerosis elsewhere and those having evidence of other arteriosclerosis, chiefly cerebral or cardiac.

Table 2.—*Status of 37 of 185 Patients After Sympathectomy for Arteriosclerosis Obliterans*

Status After Sympathectomy	Nondiabetic Patients (27 of 132)		Diabetic Patients (10 of 53)	
	No.	%	No.	%
Improved	11	40.7	1	10
Unchanged	7	26.0	3	30
Worse	9	33.3	6	60

Group 3.—Patients With Rest Pain With or Without Gangrene.—The presence of rest pain indicates a severely ischemic limb and may be the forerunner of gangrene. Rest pain demands emergency treatment, and patients in this group should be hospitalized for angiographic studies in addition to

general vascular care. Even in the presence of gangrene angiograms must be made, as the limbs sometimes can be saved if arterial grafting is possible.

During the four-year period 1954-1957 more than 1,000 angiograms were made at the Cleveland Clinic, over half of which disclosed evidence of segmental arteriosclerosis obliterans (fig. 5). The morbidity in our patients undergoing angiography has been 0.1%, with no deaths.

Selection of Patients for Arterial Grafting

By adhering to the above criteria for the selection of patients for angiographic study we can determine the candidates for arterial grafting—provided a proper segmental type of occlusion is demonstrated. In patients in group 1 arterial grafting should be elective. The actual importance of the disability should be clearly determined, and in cases of this type the physician must advise the patient to the best of his judgment about the chance for recovery and improvement. In patients in group 2, especially if claudication is rapidly advancing, arterial grafting should be recommended. All patients in group 3 should undergo grafting, provided the angiograms indicate that it is technically possible. In all three groups the patient's general state of health must be considered before surgery is recommended. In patients in group 3, however, grafting may be considered an emergency procedure even in the poor-risk candidate.

For arterial grafting, as for all surgical procedures, it is not possible to outline rigid criteria as a strict guide for distinguishing operable from inoperable conditions. Each patient must be considered individually, but the grouping as outlined has proved helpful as a general guide in the selection of patients. Although angiograms are the best guide to the feasibility of surgery, we have encountered a few cases in which the angiograms indicated borderline operability, yet grafting was technically infeasible. We also have seen several cases in which the reverse was true: the angiograms indicated inoperability, yet grafting was possible. The above criteria for selection of cases for grafting do not apply to patients with aneurysm.

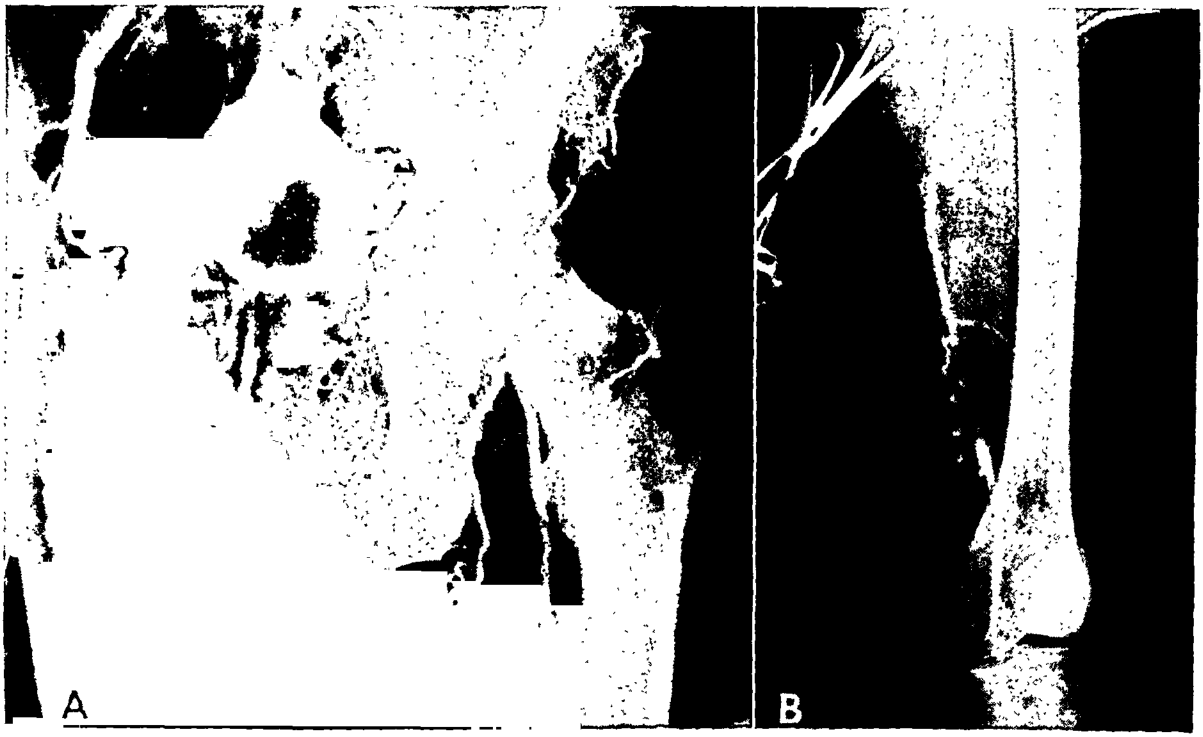

Fig. 5.—*A*, aortogram, showing segmental occlusion of left external iliac artery. *B*, femoral angiogram, showing segmental occlusion of superficial femoral artery.

Results of Arterial Grafting.—From 1954 through 1957 arterial grafting was performed in 348 patients for arteriosclerosis obliterans and in 86 patients for other diseases. Homografts were used in all of the patients. The mean age of the patients at the time of grafting was 51 years; the sex ratio was eight men to one woman. Table 3 summarizes the operative data.

For this discussion the follow-up results include only the cases of arteriosclerosis obliterans. The maximum follow-up time was four and one-half years and the minimum, six months. All of the patients were examined at regular intervals, and a detailed follow-up record was established for each patient.

Of the 348 patients who came to operation 40 had such extensive disease that it was not technically feasible to establish an open graft, but graft procedures were performed in the other 308 patients. Angiograms of most of the 40 patients with inoperable disease indicated extensiveness of the lesions, but it was believed in each case that grafting might be successful and certainly would be worth trying because of the critical condition of the limb.

TABLE 3.—*Summary of Arterial Grafts Performed from 1954 Through 1957*

Disease	Site of Operation	Patients, No.	
Arteriosclerosis obliterans of extremity	Aortoiliac artery	166	
	Femoropopliteal artery	173	
	Renal artery	8	
	Carotid artery	1	
Total			348
Aneurysm	Abdominal aorta	85	
Carotid body tumor	Carotid artery	1	
Total other			86
Grand total			434

Of the 308 patients 22 died in the immediate postoperative period, 9 because of technical failures and 13 from other causes. Thus, 286 patients survived and were available for follow-up study. Results were considered successful in 230 patients who were free of symptoms and had palpable pulses. In the other 56 patients a late shutdown occurred; however, 35 of these patients underwent regrafting and 31 have had a successful result. Of the patients who had regrafting there was evidence of progressive disease distal to the primary graft in 31; this extension of arteriosclerosis was the cause for failure. In the remaining four the cause of late shutdown was in the graft itself. Including the 31 patients with successful regrafts, a total of 261 patients showed satisfactory results. Of the remaining 21 patients 16 were asymptomatic without palpable pulses and 5 were found to have symptoms but refused surgery.

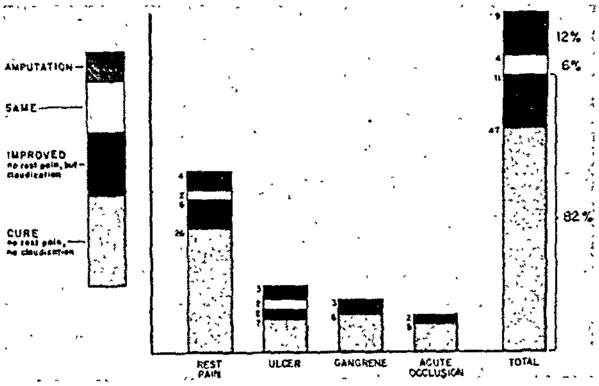

Fig. 6.—Summary of results in patients with severe ischemia undergoing arterial grafting.

In the above series of arterial grafts we included the cases of patients with severe ischemia of the limb. Many of these cases were related to a sudden arterial thrombosis that is secondary to arteriosclerosis obliterans, and others are related to rapid progression of the disease without actual thrombosis in situ but with poor collateral circulation. These patients may have had ulceration or gangrene. Prior to the advent of arterial grafting—regardless of therapy—amputation was inevitable in many cases. Inasmuch as these cases represent a different situation, and are more critical than those in which there is simple intermittent claudication, we have summarized our results separately. Figure 6 summarizes the results in patients with severe ischemia undergoing arterial graft. A total of 71 patients were operated on and 47 had complete relief of symptoms.

In contrast, figure 7 summarizes the results in a similar group of patients who underwent sympathectomy. In this series 66 patients were operated on and 3 had complete relief of symptoms, complete relief being defined as the disappearance of rest pain, and healing of the ulcerative or gangrenous areas. As mentioned previously, we believe that when a patient has evidence of severe ischemia an angiographic study should be made as soon as possible, and if this study indicates that arterial grafting is feasible it should be the preferred procedure.

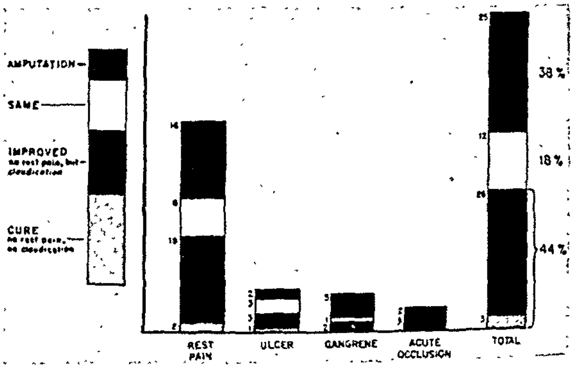

Fig. 7.—Summary of results in patients with severe ischemia undergoing sympathectomy.

Comment

During the past few years much has been learned about the nature and progression of arteriosclerosis obliterans. Until recent years this disease was considered a relentlessly progressive one, whether slow or rapid, and the available medical means of therapy were considered to have little or no effect on the disease. Studies now indicate that this concept is not correct and that approximately 75% of patients with arteriosclerosis obliterans show little progression of the disease over a five-year period. Thus it would seem that any evaluation of medical therapy is handicapped by the fact that some patients improve spontaneously and others remain *in statu quo*. We believe, however, that it is most essential to diagnose these cases early and to advise the patients of the necessity of strict adherence to good hygiene of the feet, protection from trauma, avoidance of extremes of temperature, and non-use of tobacco.

For patients in whom there are signs of progression or definite ischemia as described above, we believe that angiography provides a most desirable method of study. Angiographic study has demonstrated the presence of segmental arteriosclerosis, which may be considered a relatively new concept, inasmuch as patients with evidence of vascular disease were thought to have involvement of a diffuse type. We believe that arterial grafting is indicated, if it is technically feasible as demonstrated by angiography, in patients of the groups described above. Up to the present time, the question of the best material to use in arterial grafting has not been settled, but much work is being carried on in the field of arterial prosthetics, and the future will undoubtedly see improved material become available. We have continued to use homograft material, because it is both available and, in our experience, satisfactory, but we could qualify this statement.

Improvement in techniques continues. It will be noted that in our series there were nine deaths due to technical failure. Seven of those occurred during the first two years and two occurred during the last two years. We believe that the reduction in deaths and failures during the past two years has been entirely related to improvement in techniques as a result of wider experience in the field. We have also noted that when a failure does occur it is usually during the first postoperative year. If a graft remains patent beyond this time there appears to be little chance of its failing, at least in the follow-up time of 48 months in our series. Of our late shutdown failures 35 were in patients who had regrafts and 31 showed evidence of progression of the disease beyond the site of the graft as the cause of the late shutdown. As a general rule, this type of situation occurred in the young patients rather than the older ones. In nonocclusive disease, i. e., aneurysm, there have been no shutdowns.

In a follow-up study of patients after operation, 13 late deaths were recorded. Of these, only seven were due to cardiovascular complications.

Summary

A five-year follow-up study of 500 patients with arteriosclerosis obliterans indicates that the disease may progress and cause disability in one of four patients. Angiography is the only method that demonstrates the presence of the segmental type of arteriosclerosis obliterans, and all patients with severe ischemia, with or without gangrene, should have the benefit of angiographic study in order to determine the feasibility of arterial grafting. In selected cases arterial grafting may be the preferred treatment.

Addendum

Since this paper was presented we have used more than 100 dacron prostheses, in addition to homografts, with comparable early results.

2020 E. 93rd St. (6) (Dr. LeFevre).

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DOG BITES.—The pet animal population in the United States has been increasing rapidly in recent years and, according to Carithers, there are probably about 25,000,000 dogs and 35,000,000 cats in this country. The pleasures of owning pets, particularly dogs, far outweigh the dangers resulting from bites and diseases that animals may cause and the nuisance that they may be in a community. Perhaps these joys and pleasures traditionally cause Americans to resist regulation and licensing of dogs. Accompanying the pleasures which animal pets provide are also the problems of animal bites, rabies, and other diseases transmissible from animal to man. . . .

It has been estimated that approximately 600,000 persons are bitten by dogs each year in the United States; 5 to 10% of the victims have to take antirabies vaccine and about $5,000,000 is spent annually for medical care and public health activity. . . .

Perhaps of greater concern than the cost of dog bite treatment, cosmetic problems due to facial wounds, and the immeasurable loss in wages due to injuries, is the mental anguish that parents suffer when their child is bitten by a dog. This emotional strain is intensified if the dog should happen to be a stray animal in an area where rabies is endemic. The uncertainty of rabies can be a terrifying experience.—Duane Brobst, D.V.M., M.P.H., Henry M. Parrish, M.D., M.P.H., and Frank B. Clack, V.M.D., M.P.H., The Animal Bite Problem, *Veterinary Medicine*, May, 1959.

HEMATOLOGICAL SAFEGUARDS DURING TREATMENT WITH THE PHENOTHIAZINE DERIVATIVES

Anthony V. Pisciotta, M.D., Wauwatosa, Wis.

The phenothiazine derivatives have been of great use in the therapy of mental illness. Any therapeutic agent has potentially toxic properties and the phenothiazines have proved no exception in this regard. The most common toxic manifestations of these drugs, such as drowsiness, emotional disturbances, nasal congestion, Parkinsonism, and dermatitis, have not been considered dangerous as far as the life of the patient is concerned. Jaundice, during phenothiazine therapy, while of lower incidence, is usually self-limited, but permanent liver damage may occur if the drug is continued.

Least common of all reactions, but unquestionably the most serious, is agranulocytosis. This communication deals particularly with the clinical peculiarities of agranulocytosis induced by the phenothiazines and with measures concerned with its possible prevention. Unfortunately, at present there is no reliable laboratory test by which one can accurately predict whether agranulocytosis will follow the use of a drug in a certain individual. Since we do not know the mechanisms which are responsible for agranulocytosis, we have no choice but to establish safeguards on a clinical and, at times, strictly empirical basis.

Agranulocytosis will develop in only a small percentage of persons taking a drug. With certain drugs, such as amidopyrine, this hematological reaction has been attributed to immunological hypersensitivity.[1] In other instances, drug reactions seem to occur because of a possible genetically constituted or acquired abnormality in chemical or enzymatic factors within the blood cells, as yet unknown. This group of blood reactions, peculiar only to a few individuals, is described by the rather indefinite term "toxic," but may be somewhat analogous to the hemolytic reaction attributed to primaquine.[2] Thus, with the thioureas and the sulfonamides, agranulocytosis would not develop before two to eight weeks after the drug was started. In many cases it was of gradual onset and occurred only after large doses of the drug were given which coincided with a possible concentration of the toxic drug in the bone marrow. Frequently, the symptoms of infection did not occur unless the leukopenic reaction had gone unnoticed while the drug continued to be given. What is known of the clinical picture of agranulocytosis induced by the thioureas and the sulfonamides seems applicable to the phenothiazines.

Agranulocytosis followed the administration of chlorpromazine in 18 patients undergoing therapy for mental illness. The total cumulative dose that induced this reaction ranged from 2 to 112 Gm., with an average of 20 Gm. The time required for leukopenia to develop ranged from 10 to 400 days, but in most cases it was recognized after 20 to 45 days of therapy. It was found in highest incidence in women and only in Caucasian patients. During prolonged periods of treatment with this drug it was impossible to predict when a sudden drop in the leukocyte count would occur. When phenothiazine derivatives are used in treating chronic mental illnesses, it is considered essential that weekly leukocyte counts be made, especially between the 2nd and 10th week of treatment; that monthly counts be made thereafter as long as the patient continues to receive the drug; and that observers be instructed to report promptly all instances of sore throat, stomatitis, fever, malaise, chills, or other evidences of infection.

Clinical and hematological study of 18 patients with agranulocytosis induced by chlorpromazine and those reported by others has disclosed a number of peculiarities which may provide clues relative to the nature of the reaction and its possible prevention. These were described in detail in another communication.[3] These experiences have not been sufficiently extensive to withstand critical analysis, but some limited generalizations may be made at this time. It has been found that agranulocytosis is of greatest incidence in Caucasian women and to the present writing is not known to occur in Negroes, except for an occasional instance of moderate leukopenia in Negroes on therapy with huge doses of chlorpromazine. With few exceptions, it has occurred almost exclusively in mentally ill patients despite the widespread general use of the drug in clinical practice. The most likely reason for this is that the mentally ill are more likely to receive larger doses of the drug over a long period of time. There is a remote possibility, however, of a chemical or enzymatic abnormality peculiar to mental illness, which might result in an increased susceptibility to agranulocy-

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From the Blood Research Laboratory, Department of Internal Medicine, Marquette University School of Medicine and Milwaukee County General Hospital, Milwaukee.

tosis. In susceptible individuals, the clinical occurrence of agranulocytosis induced by phenothiazines appears to depend on dose of drug and length of time it is administered. In our series, agranulocytosis occurred after a total cumulative dose of 2 to 112 Gm. of chlorpromazine, with an average of 20 Gm. The time required for leukopenia to develop was 10 to 400 days after phenothiazine therapy had been started, but most cases occurred after about 20 to 45 days of therapy. The pattern of development of agranulocytosis has been studied in susceptible patients during sustained treatment with a high dose of the drug. During the period of incubation, the leukocyte count may show no change, but in some individuals there is a tendency to a gradual diminution in the number of white blood cells. When agranulocytosis occurs, there is a sudden drop in leukocytes, which reach their lowest point in two to five days. At this time, the bone marrow shows a highly selective aplasia of all granulocyte precursors. At the beginning of agranulocytosis, no symptoms and no infection may be present so that routine blood cell counts are necessary for the early diagnosis of this hematological reaction. If treatment with phenothiazine is continued, infection will almost certainly develop, manifested by fever, pharyngitis, proctitis, and septicemia. If the drug is withdrawn, recovery usually occurs within 5 to 10 days, provided the patient does not die from infection.

The effects of readministration of the drug were reported by Yules and Baker[4] and by me and my associates.[3] One woman, given chlorpromazine in lower dosage, showed no subsequent hematological reactions, even after a year of follow-up examinations. Another woman, who had agranulocytosis induced by chlorpromazine (Thorazine), developed agranulocytosis a year later after a month of treatment with promazine (Sparine), and, one year after this episode of agranulocytosis, developed it again one month after continuous administration of prochlorperazine (Compazine).

Protective Measures

The following clinical observations form the basis for the protective measures during therapy with phenothiazine derivatives which are presently employed at the Milwaukee County Hospital for Mental Diseases. It is understood that some of these recommendations are subject to change, pending additional experience with this type of blood reaction during therapy with phenothiazines.

As with any drugs with potential side-effects, it is recommended that administration of the phenothiazine derivatives, especially in high dosage, sustained over a period of several weeks, be carried out only if the clinical indications are sufficiently clear-cut to warrant the risk entailed. When used, the smallest amount to give the desired clinical effect should be given.

Because the onset of agranulocytosis is generally later than 10 or 20 days after beginning of treatment, rigorous hematological controls may not be necessary during short-term (i. e., less than two weeks) administration of small amounts (less than 75 mg. daily) of chlorpromazine. Even at that, it would be desirable to get a leukocyte count at the beginning and at the end of short-term therapy. On the other hand, the prolonged or permanent administration of the drug requires that weekly leukocyte counts be made, especially between the 2nd and 10th week of treatment. Thereafter, a monthly leukocyte count should be made as long as the patient continues to receive the drug. Even then, this is not regarded as entirely safe, as a sudden drop in the leukocyte count may occur at any time.

Great reliance should be placed on clinical observation of the patient during time of treatment with phenothiazine by nurses, attendants, and physicians acquainted with the clinical manifestations of agranulocytosis. Observers should be instructed to report promptly all instances of sore throat, stomatitis, fever, malaise, chills, or other evidences of infection.

If the leukocytes show a gradual drop, the stained smear should be studied when leukopenia occurs. In agranulocytosis, one expects to see an absolute fall in the number of neutrophilic stab forms or segmented cells and a predominance of mature lymphocytes. The drug should be withdrawn if the total leukocyte count falls under about 3,500 per cubic millimeter or if the total number of neutrophilic granulocytes represents less than 30% of the differential count. A leukocyte count between 3,500 and 4,000 per cubic millimeter and granulocytes between 30 and 50% require daily observation while the drug is being continued. A sudden drop in leukocyte count from a normal to leukopenic levels (less than 3,000 per cubic millimeter) within one week necessitates that the drug be withdrawn immediately and the patient isolated and placed on protective therapy with antibiotics. It would be useful to examine the bone marrow in case of doubt or at the height of agranulocytosis, as granulocytic aplasia or hypoplasia is a characteristic finding.

The fact that agranulocytosis occurs in men, despite its lower incidence, makes it necessary to apply these precautionary rules during the time men are treated with the phenothiazine derivatives. We may consider that while Negroes show a diminished susceptibility to this drug, the possibility of agranulocytosis demands that patients of this racial group have periodic leukocyte counts if they are receiving daily doses of phenothiazine which exceed 100 mg. for a period greater than two weeks.

Despite the observations that chlorpromazine may be readministered to a susceptible patient without the immediate recurrence of the disease, it is unwise to treat any person recovered from phenothiazine-induced agranulocytosis with the same or related drug.

8700 W. Wisconsin Ave. (13).

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HAZARDS TO THE HOST OF BENIGN INTRATHORACIC TUMORS

Richard H. Overholt, M.D.
and
Wilford B. Neptune, M.D., Boston

The tumor hazard to the host depends on two factors: the location of the lesion in relation to vital structures and the cancer potential. Correlation of clinical data (history, physical findings, roentgenograms, endoscopy, cytology, function tests, and living surgical pathology) now permits a more accurate appraisal of the two risks. The hazard of benign intrathoracic tumors is dependent on their location in relation to tube structures of the upper mediastinum and the potential threat of malignancy. During the past three decades, exploration of the thoracic cavity has become a common event in many hospitals. The act which establishes the diagnosis, i. e., total biopsy, provides simultaneously curative therapy. Hazards to the host of benign tumors greatly exceed the risk of their removal.

The presence of a new growth anywhere in the body calls for an estimate of risk. One must balance the potential threat of the lesion itself with the risk of treatment. The tumor hazard to the host depends on two factors: the location of the lesion in relation to vital structures and the cancer potential. The risk of excising the tumor is determined, to a considerable extent, by these same factors plus the experience of the surgical team.

During the past three decades, exploration of the thoracic cavity has become a common event in many hospitals. Correlation of clinical data (history, physical findings, roentgenograms, endoscopy, cytology, function tests, and living surgical pathology) now permits a more accurate appraisal of these two risks—that imposed by the tumor and that of treatment.

Most mediastinal tumors are benign; most intrapulmonary tumors are malignant. (Tumors of lymphatic origin are excluded, since they must all be considered as malignant.) Regardless of histological classification, either type may be lethal. Death is usually not produced because of the implication of the lung, per se. One lung may be totally destroyed or compressed and yet the other still sustain life. The crowding within the mediastinum caused by an expanding benign tumor or a metastatic pulmonary cancer is responsible for most deaths. The location of a growth within the area of such vital tubes as superior vena cava, azygos and innominate veins, carotid arteries, trachea, and esophagus makes possible the obstruction of one or more of these structures before the heart or lung is overwhelmed.

The rate of expansion has a bearing on risk. If serial x-rays over a period of several years are available, some estimates of past growth can be obtained. Unfortunately, they do not indicate future behavior.

Thoracic Surgeon, New England Deaconess Hospital and New England Baptist Hospital, and Director, Overholt Thoracic Clinic (Dr. Overholt); Thoracic Surgeon, New England Deaconess Hospital, and Associate, Overholt Thoracic Clinic (Dr. Neptune).

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A Dangerous Site

Benign mediastinal tumors take origin from the various tissues of the area. Histological types have their sites of predilection. The four quadrants of the mediastinum serve as a useful way to group them. The most common tumors are indicated in figure 1.

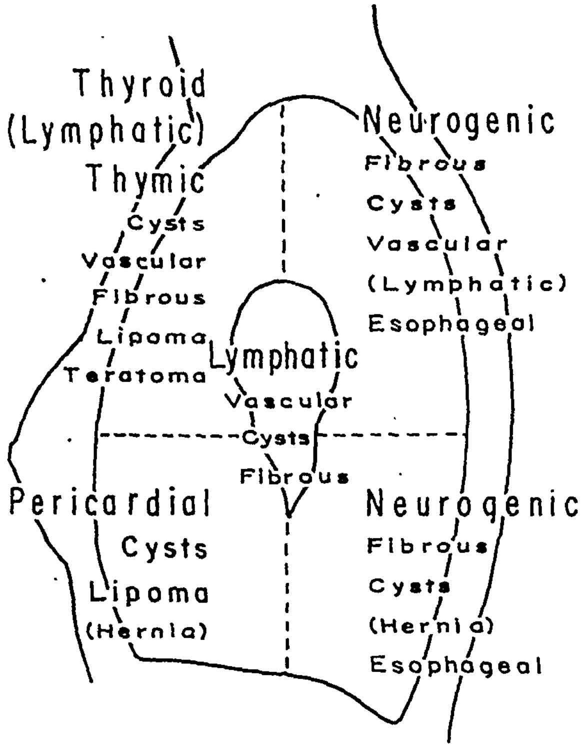

Fig. 1.—Most common location of mediastinal tumors. Although thymic and lymphatic tumors are listed, we consider all such tumors malignant. Also, hernias are shown, since they present tumor-like shadows.

Tumors arising posteriorly in the paravertebral sulcus in either the upper or the lower part of the thorax are not strictly within the mediastinum. They are situated lateral to vertebral bodies and mediastinal pleura. They expand in the direction of the lung and at the expense of its volume. They may attain great size without producing symptoms or disturbing pulmonary function to a noticeable degree. Pressure on intercostal nerves may cause pain. Their greatest hazard is to the central nervous system, for they may grow within a vertebral foramen and compress the spinal cord.

Superior mediastinal tumors are in the most dangerous position of all. If centrally placed beneath the manubrium they become wedged between it and the vertebra and expansion must be in a lateral direction. Tubular structures are displaced or compressed (fig. 2 and 3). The tracheal rings will resist pressure longer than vascular tubes. The trachea usually becomes displaced far to the right or left long before its lumen is reduced in diameter. The esophagus, having a muscular tube whose walls are normally in apposition except during acts of deglutition, also suffers displacement but hardly ever is obstructed by an expanding benign tumor. Occlusion of the esophagus rarely takes place except when its mucosa has been invaded by a malignant tumor or there is circumferential cicatrization of its wall as a result of infection or trauma.

Lower anterior tumors have little room in which to expand. The roof (sternum) and the floor (heart) do not yield to the pressure of tumor expansion. The density of the heart and its constant motion prevent growth in that direction. Tumors taking origin in this area push to one side or the other, rarely both. The lung suffers most of the volumetric loss as these tumors grow. In advanced states, there may be cardiac displacement or compression.

The majority of benign tumors taking origin within the lung do not disturb its function until they have attained great size. The most common, hamartoma, usually grows slowly and silently at some distance from a major bronchus or tangential to it. Rarely is a bronchus obstructed. Usually, important vascular structures escape impingement. Bronchial adenomas and papillomas do cause serious trouble, not because of displacement of vital structures but because they often occlude the bronchus at their site of origin. Most of the host disturbance results from secondary infection and the effects of the bronchial occlusion.

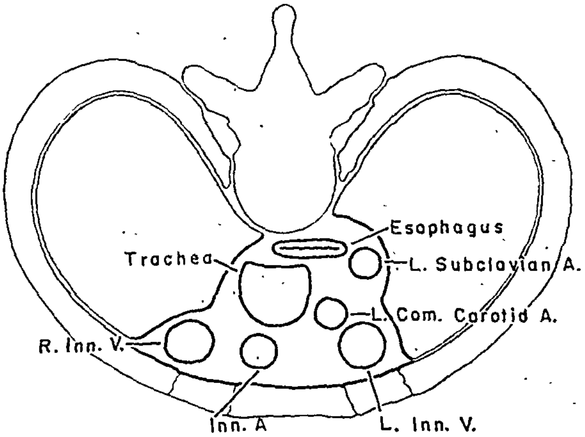

Fig. 2.—Cross section of upper part of the thorax. Vital structures within mediastinal area are shown.

Paradox of Shadow Density

There are no absolutes in nature. This is true for the growth characteristics of various tumors and also for their roentgenographic shadows. The more dense, clear-cut, and undisputed the x-ray evidence, the more ominous and threatening the lesion appears to many physicians. Shadows with densities of great contrast seem to evoke immediate consideration for action. Top priority is given to neoplastic possibility. The paradox of shadow density is that risk is usually inversely related to degrees of density. Hazy, ill-defined disputable areas of altered density do, in fact, represent lesions carrying a far more serious import than the circumscribed, dense, "easy-to-see" shadow. This paradox applies particularly in asymptomatic cases.

In an asymptomatic 67-year-old nonsmoking woman a chest film showed an ill-defined area of density in the upper right part of the lung field, with a questionable central zone of rarefaction (fig. 4*A*). Cytological, bacteriological, and skin tests were negative. This vague x-ray finding proved to be the most serious of all those illustrated in this article. The other shadows are denser, more clear-cut, and apparently more ominous. Yet this was the shadow of a cancer; the others were of benign lesions.

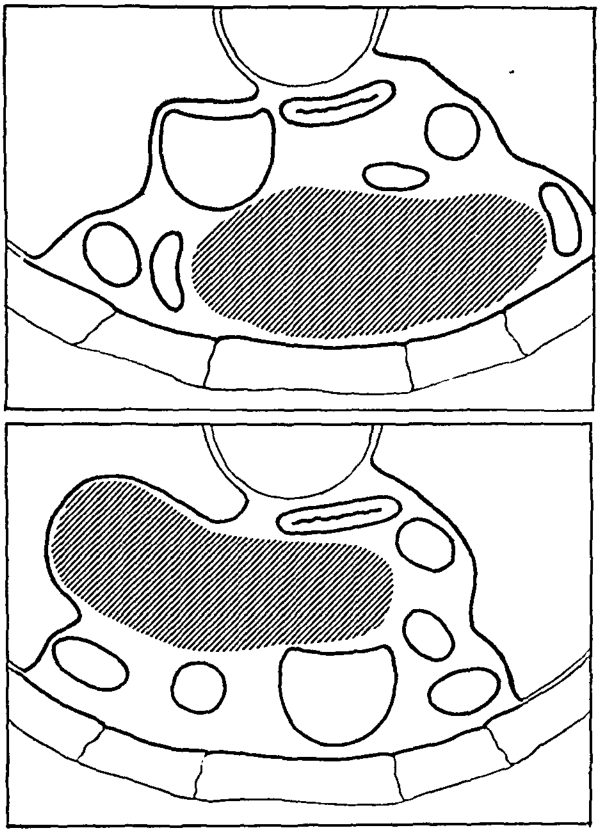

Fig. 3.—Cross sectional drawings of mediastinum, illustrating displacement and compression of tube structures as result of benign tumor expansion in this area.

Calcium as an Age Indicator

Risk can be more accurately appraised if the future behavior of a neoplasm can be foretold. Fortunately, a few intrathoracic lesions become calcified. The presence of such deposits in all parts of the area of density is a very reliable "built-in" age indicator. Their growth must have terminated when the calcium salts were precipitated within them.

If a calcific tumor does not cause symptoms or disturb function of neighboring structures, it may remain indefinitely without great risk. Larger, stationary tumors may, by space occupancy, reduce pulmonary reserve to a critical level. Then, the slight risk of removal would be well balanced by the advantages of increasing cardiopulmonary reserve.

A large calcified tumor was found on a chest film in a 48-year-old asymptomatic woman (fig. 4*C* and *D*). The size, shape, and character of the shadow has not changed since the discovery film, 10 years previously. Its space occupancy reduces the functional capacity of the left lung proportionately, but this is not a serious hazard.

The factor of safety, implied by the presence of calcium, does not apply if there are two components of the area of density, one with and one without calcification. Cells capable of growth may be present in the "soft" area. The hazard to the host of this component, considered separately, must then be weighed against the risk of excisional therapy.

Balancing Risks

Individual patients with benign tumor problems are not helped much by statistical analysis of large groups of figures. It is important, however, to know which risk is the greater, that imposed by the tumor or that of treatment. No estimate of the hazard of continued growth of benign tumors is possible. In fact, one is not able to make an absolute diagnosis of a shadow. The growth pattern of those lesions which have been removed is interrupted by the act which establishes identity. It is, therefore, impossible to provide control series of like cases. However, the cancer potential of intrathoracic tumors can be gauged from collected series of excised lesions. The proportion of malignancy in intrapulmonary tumor-like shadows exceeds 20%. Davis and others[1] state that 36% of 1,203 of a collected group of solitary pulmonary nodules were malignant. In a collected series of 396 mediastinal tumors (excluding those of lymphatic origin), Ringertz and Lidholm[2] report a cancer incidence of 11%.

The risk of exploration and removal of intrathoracic tumors comes well below the risk of the lesions in both categories. In our experience, the operative mortality in the past five years has been less than 1% for all mediastinal tumors and less than 1% for benign, intrapulmonary tumors. (During the past five years 128 patients with tumor-like shadows have been treated by intrathoracic exploration and excision for nonmalignant conditions. There was no operative mortality. It seems reason-

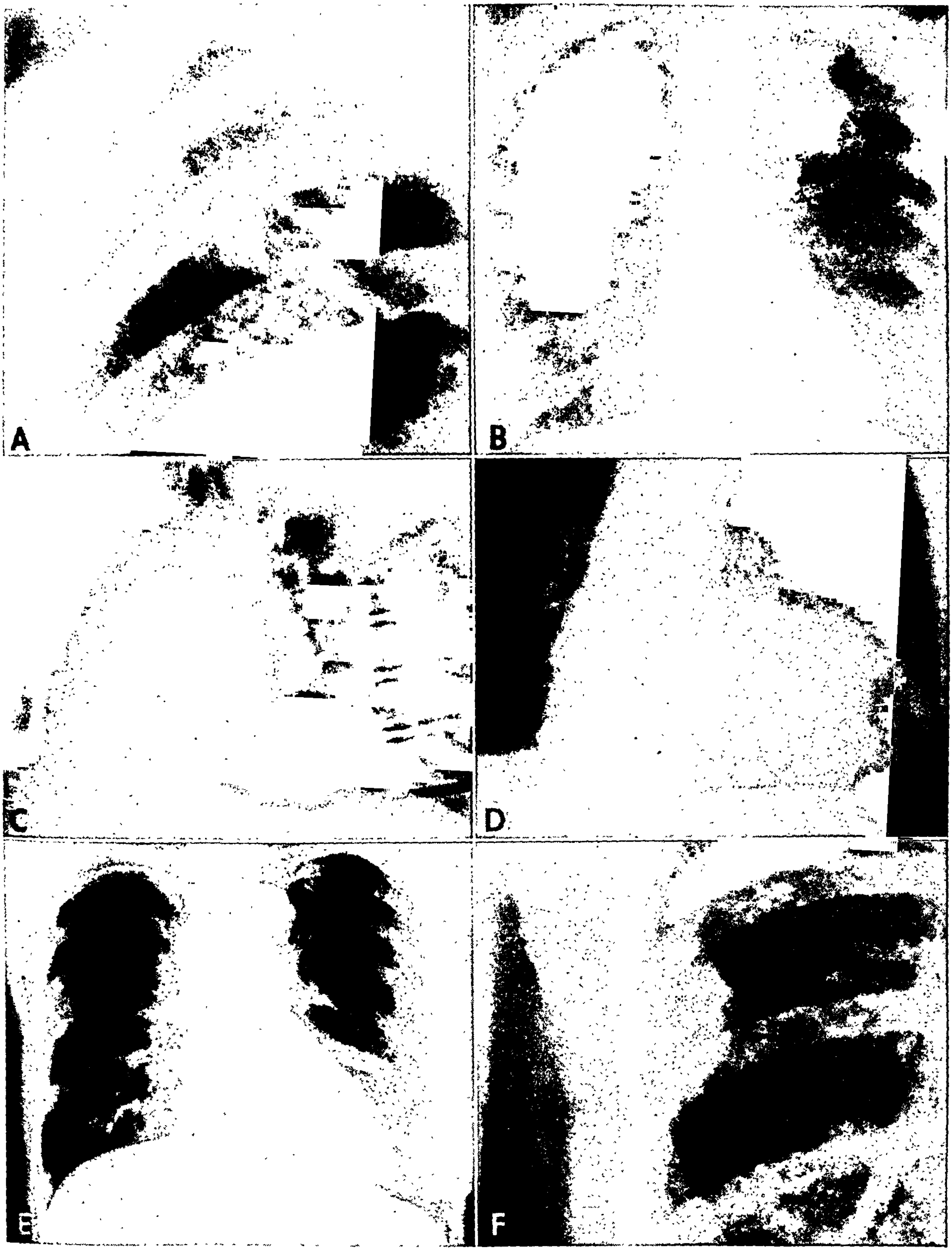

Fig. 4.—*A*, ill-defined area of density with questionable central zone of rarefaction in spot film of upper part of right lung field in asymptomatic 67-year-old nonsmoking woman. Vague x-ray finding proved to be most serious of those illustrated; this was shadow of cancer. *B*, chest film revealing large, irregular area of great density in upper third of left lung field. This lesion proved to be intrapulmonary and benign (hamartoma). *C* and *D*, chest films revealing large calcified tumor in asymptomatic person. Size, shape, and character of shadow has not changed since discovery film, 10 years previously. *E*, x-ray taken two years after removal of patient's right breast for carcinoma. *F*, spot film from same case, showing rib detail with evidence of altered contour of seventh rib. Lesion plus rib was completely excised for total biopsy. Lesion proved to be benign schwannoma taking origin from intercostal nerve.

able to place the calculated risk for surgical treatment of benign lesions at a figure which is less than 1%.)

Single Act for Verification and Treatment

By their very nature and location, most benign intrathoracic tumors do not yield to a precise preoperative histological diagnosis. Bronchoscopy, cytological examination of bronchial secretions or pleural fluid, or cervical-node biopsy fails to settle the issue. Intraluminal bronchial tumors may be an exception. Rarely does information obtained by transthoracic needle biopsy aid in patient management. If resection is possible, such a preliminary keyhole approach adds a risk with no counterbalancing benefit. Aspiration of material from a large peripheral tumor might be justified in patients who are obviously inoperable. The exact identity of noncalcified intrathoracic neoplasms is preferably determined by total biopsy. It is a rare benign tumor which cannot be completely and safely extirpated. Many malignant lesions can be totally extirpated as well. If a lesion is malignant and unresectable, a partial removal or adequate biopsy yields important information to gauge radiation or chemotherapy.

The decisive step necessary to establish the diagnosis, therefore, becomes for most cases the curative procedure. Discovery and localization are accomplished by a single act—radiography. Diagnosis and treatment are also one procedure. When risks are weighed and the patient is advised as to the best course to follow, management can be direct, simplified, and safe.

In a 40-year-old woman a chest film revealed a large, irregular area of great density in the upper third of the left lung field (fig. 4*B*). This shadow-producing lesion proved to be intrapulmonary and benign. It was a hamartoma. Total biopsy by lobectomy proved to be curative.

Two years after removal of her right breast for carcinoma, a 46-year-old woman had evidence on a spot film of altered contour of the seventh rib (fig. 4*F*). The lesion plus the rib was completely excised for total biopsy. The lesion proved to be a benign schwannoma (neurolemoma) which took origin from the intercostal nerve. This diagnostic act simultaneously became the curative procedure.

Approaches

Intrathoracic exploration has advantages over exploration in other areas. A single organ, the lung, occupies this large body cavity. It can readily be deflated to permit a clear view of all areas. The mediastinum may be widely exposed from either side or from above.

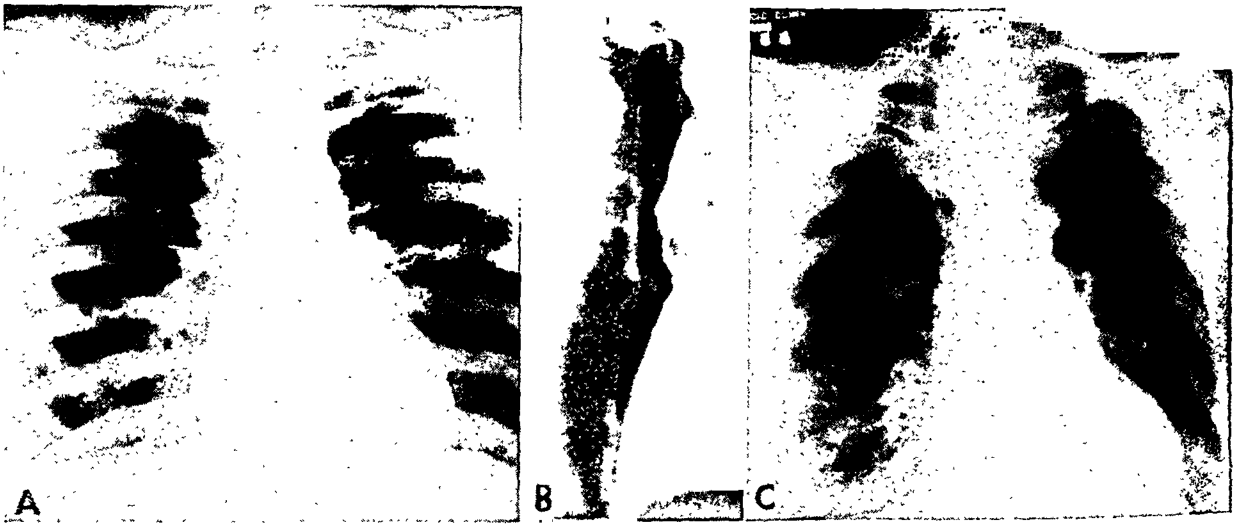

Fig. 5.—*A*, x-ray revealing widened upper mediastinal area in patient with substernal distress and mild dysphagia. *B*, esophagram from same case, showing distortion and luminal dilatation. At thoracotomy large mass was found involving esophagus, with forward displacement of trachea and great vessels. Tumor proved to be benign leiomyoma. *C*, chest film illustrating most common of all benign intrathoracic tumors, goiter. Note marked deviation of trachea.

The intrathoracic space can be approached in various ways, depending on the tumor site. A posterolateral incision with the patient in the prone position is used for most highly placed tumors or for those which will probably require segmental or other types of lung resection. For low lesions, an anterior incision placed below the breast is frequently chosen. Rarely is a sternal-splitting incision or transection required, even for large mediastinal tumors which bulge both ways. The sternum is a narrow structure, and the area below it can be widely exposed transpleurally from either side. This avoids disruption of the central support.

Most benign tumors within the mediastinum can be clearly enucleated without injury to neighboring structures. After the mediastinal pleura is divided and the proper plane of separation is developed, a finger can be passed over or under the tumor to the opposite side. Then counterpressure dislocates the tumor into the operative area. The blood supply is secured, and the tumor is quickly extracted.

Usually, a benign tumor within the lung can be enucleated easily without loss of lung substance. Some may require a subsegmental resection. Rarely need a lobe be sacrificed.

The osseous cage itself can be reconstructed securely. Ribs are never resected unless they are involved with the tumor. The ends of severed ribs or cartilages can be firmly reunited. When the lateral shafts of ribs are being anchored, sutures can be placed through punch holes to avoid intercostal nerves. The precise reapproximation of fascia, muscle, and skin layers eliminates or minimizes postoperative discomfort; convalescence is speeded, and the total period of disability is shortened.

X-ray in a 34-year-old woman who had substernal distress and mild dysphagia revealed a widened upper mediastinal area (fig. 5*A*). An esophagram showed distortion and luminal dilatation (fig. 5*B*). At thoracotomy a large mass was found involving the esophagus, with forward displacement of the trachea and great vessels. The tumor was sausage-shaped, 4 cm. in diameter and 10 cm. in length. The muscle coat of the esophagus was markedly thinned out, but the mucosa was not involved. Enucleation was accomplished without injury to the mucosal tube. All symptoms were relieved, and the patient remained well. This tumor proved to be a benign leiomyoma.

In a 62-year-old woman who complained of cough and severe dyspnea a chest film revealed a goiter (fig. 5*C*), the most common of all benign intrathoracic tumors, and marked deviation of the trachea. Veins of the neck were distended, indicating superior vena caval obstruction. The possibility of a carcinoma of the thyroid was entertained. At exploration, with the cervical approach, a benign, nodular goiter was removed from the superior mediastinum. The obstruction of the tubular structures of the area was immediately relieved. The patient has remained well.

Summary

The hazard to the host of benign tumors is dependent on their precarious location in relation to tube structures of the upper mediastinum and the potential threat of malignancy. A paradox of roentgenographic interpretation exists in many cases; the less dense or ominous the appearance of the shadow, the more serious is the substance that has produced the shadow. An indication of the age of the lesion may be provided by calcific deposits within it.

The act which establishes the diagnosis, i. e., total biopsy, provides simultaneous curative therapy. Hazards to the host of benign tumors greatly exceed the risks of their removal.

135 Francis St. (15) (Dr. Overholt).

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MALIGNANT CARCINOID.—The pathological entity of carcinoid tumors is well recognized. They are encountered in the gastrointestinal tract from the cardia to the rectum, being seen most frequently in the appendix (70 per cent), the rectum (10 per cent), and in the terminal ileum. In the small bowel, the incidence of malignant behavior ranks as high as 25 to 50 per cent. Many of these carcinoid tumors with extensive metastases act as an endocrine neoplasm and produce a peculiar syndrome. . . . The presence of a functioning carcinoid tumor should be suspected not only when the entire syndrome is present but whenever any single sign or symptom is encountered. Valvular heart disease, hepatomegaly, hot flushes, chronic diarrhea, and so forth, are worth more critical investigation. A malignant carcinoid tumor should also be considered in patients with metastatic neoplasms who have an unexpectedly benign and prolonged course. . . . Any surgeon faced with a malignant intestinal neoplasm having regional or distal spread should rule out the possibility of a carcinoid before deciding upon a bypass procedure. Because of the slow growth of both primary and metastatic argentaffinoma, and also because of the serious ill-effects of excess serotonin, every effort should be made to remove as much of the tumor tissue as is technically and safely possible. Carcinoid tumors should no longer be considered benign.—Pierre Grondin, M.D., M. E. Donley, M.D., Tirso Del Junco, M.D., D. E. Ross, M.D., Malignant Carcinoid Syndrome, *Western Journal of Surgery, Obstetrics and Gynecology,* November-December, 1958.

CLINICAL NOTES

TORSION OF THE GALLBLADDER

Sadredin Musavi, M.D
and
George H. Yeager, M.D., *Baltimore*

Wendel[1] reported the first case of acute torsion of the gallbladder. To date, 112 cases of torsion of the gallbladder have been collected from the world literature. In only two cases was a correct preoperative diagnosis made.[2]

Report of a Case

An 82-year-old woman was admitted to University Hospital on Dec. 22, 1956, because of the sudden onset of right-sided abdominal pain about 30 hours prior to admission. The pain was associated with nausea and bile-stained vomit. The patient had had gallbladder disease 10 or 15 years ago. Four years prior to this admission, at another hospital, a cholecystogram and gastrointestinal x-ray studies were made, results of which are said to have been normal except for gastroptosis.

The patient was hypasthenic, with marked thoracic kyphosis. She was moderately dehydrated. The pulse was 100 per minute; blood pressure, 150/80 mm. Hg. Rectal temperature was 101 F (38.2 C). She appeared acutely ill. The right side of the abdomen was exquisitely tender. The rest of the abdomen was soft. There was no distention and no abdominal masses could be defined. Proctoscopic and pelvic examination revealed no abnormality.

Results of laboratory studies were as follows: hemoglobin level, 14.5 Gm.%; leukocytes, 17,500 per cubic millimeter; hematocrit value, 45%; blood urea nitrogen level, 30 mg.%; carbon dioxide–combining power, 20 mEq. per liter. Urinalysis showed normal findings except for traces of acetone and albumin.

The preoperative diagnosis was acute cholecystitis. After satisfactory hydration the patient's abdomen was explored. A moderate amount of serosanguineous fluid was encountered in the peritoneal cavity, mainly in the right gutter. The fluid had a feculent odor. The gallbladder was distended, dark purple in color, and hanging on a pedicle, which was obviously the cystic duct and artery. There was positive (clockwise) torsion of the gallbladder on this pedicle through 360 degrees. The gallbladder was removed with ease. The peritoneal fluid was evacuated and the subhepatic space drained. The gallbladder contained about 25 cc. of bloody, bile-stained material but no stones. Culture of the gallbladder contents revealed Escherichia coli. Histological examination of the gallbladder wall revealed early necrosis. The patient's condition during the first two postoperative days was somewhat uncertain, but her recovery was complete, and on the eighth postoperative day she was discharged from the hospital.

Comment

Since Wendel's report in 1898, 112 cases[3] of torsion of the gallbladder have been reported. The physical findings are not pathognomonic. Short and Paul,[4] in describing a case, suggested that if there is a mass in the gallbladder region which appears and disappears torsion and untwisting of the gallbladder should be suspected. Most patients whose cases have been reported have been women past middle age. Of 106 cases in which the age of the patient has been recorded 77 patients were over 50 years of age, including 14 patients over the age of 80 and 4 over 90. Wendel's case was that of a 23-year-old woman and is the only case of torsion with perforation on record.

Gross[3a] postulated that in the later decades of life supporting adipose tissue largely disappears from the surrounding structure, and atrophy of these tissues allows for greater ptosis of the viscera, including the floating gallbladder. Konjenzy[5] incriminated congenital ligamentous structures in the right upper quadrant causing strangulation of the floating gallbladder. Caldwell[6] suggested that a tortuous arteriosclerotic cystic artery may encourage rotation of the organ. Rais and Thulin[3b] proposed that altered position of the abdominal organs due to kyphoscoliosis might contribute to the development of torsion. Despite the large incidence of torsion of the gallbladder in elderly patients not all cases occur late in life. Cuervo[7] reported two cases. His first patient, a 5-year-old boy, survived. His second patient, an 11-year-old boy, died after delayed intervention. Stones have been reported in only 31 recorded cases.

It is obvious that a gallbladder which is completely surrounded by peritoneum and lies free in the peritoneal cavity, or one with a mesentery, is susceptible to torsion. The incidence of such anatomic relationship of the gallbladder is reported to be between 1 and 5%. Peristaltic activity of the

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From the Department of Surgery, University Hospital and School of Medicine, University of Maryland. Dr. Musavi is now at the Division of Experimental Surgery, Sloan-Kettering Institute, Memorial Center, New York 21.

transverse colon and duodenum, violent movement of the body, or a sudden fall have been thought to initiate torsion.[8]

Symptomatic, intermittent, partial torsion of the gallbladder is not recognized as a clinical entity by most surgeons. Certainly there are very few reported cases of cholecystectomy for this condition. Short and Paul[4] quote Fischer of Budapest, who described two patients, both women, aged 44 and 29, with recurrent and incomplete torsion of the gallbladder. Both patients had visceroptosis and the torsion was through 90 degrees in both. Although stones were present in both, one patient had a cholecystectomy and the other had her gallbladder anchored with sutures. Krukenberg[9] is reported to have described two patients in whom kinking of the gallbladder gave rise to attacks of colic. In each instance the gallbladder was found to be long and acutely flexed on itself.

Summary

Complete torsion of the gallbladder in an 82-year-old woman was treated successfully, although not diagnosed preoperatively. A total of 113 cases, including the one recorded here, have been reported to date.

University Hospital (Dr. Yeager).

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UNUSUAL FOREIGN BODY (STEINMANN PIN) IN BLADDER

Raymond J. Fitzpatrick, M.D., Gainesville, Fla.

Any solid material small enough to pass through the external urethral meatus may set up permanent residence in the urinary bladder. Most foreign bodies lost in the bladder have been self-introduced. Krugman and Rieser[1] reported a case of a thermometer lost in the urinary bladder by a patient who was taking vaginal temperatures to determine the time of ovulation. I recall an elderly patient who attempted dilatation of his urethral strictures with use of a wire coat hanger to the end of which was insecurely affixed a 3-in. length of wooden crayon. The wooden crayon, encased in stone, was surgically removed several months later.

Despite the degree of frequency with which orthopedic "hardware" is used in and about the hip, the orthopedic surgeon has rarely encroached by inadvertence on the urologic field. In 1936, Grant[2] reported a case of a beef-bone peg migrating into the urinary bladder of a woman patient four months after it was used in pinning an intracapsular fracture of the left femur. In 1947, Branham and Richey[3] reported a partial penetration of the left lateral wall of the urinary bladder by a Kirschner wire two months after it was used in pinning a fracture of the left femur. McCrea, cited by Branham and Richey, reported the penetration of the prostate gland by a large screw driven through the left acetabulum in an effort to pin a fractured hip. The following case has unusual features which make it worthy of reporting.

Report of a Case

An unmarried woman, aged 20, seven months pregnant, was admitted to the hospital on Sept. 20, 1957, for removal of a foreign body from the bladder. In the second month of pregnancy she began to have a constant dull ache in the suprapubic region, associated at times with burning and frequency of urination but almost always accompanied by sharp, knife-like pain at the end of urination. On each prenatal visit the family physician found pyuria, for which "broad-spectrum" antibiotic therapy had been tried without success. No other complaints were offered. The patient denied having fever, hematuria, or dyspareunia. Her history was unremarkable save for a period of hospitalization seven years previously for "pain in the left hip." The patient's memory of the illness was vague; she denied having undergone an operation but could recall that she had been "put to sleep" and that "the hip was put back in place." She subsequently developed a limp due to shortening of the left leg.

At examination the only unusual finding was a fused left hip. Urinalysis revealed numerous pus cells and 2+ albumin value. Cystoscopic examination with bladder fully distended revealed a long silvery nail-like object lying free in the bladder. The caudal end was encased in a large white calculus, as demonstrated in figure 1. The cranial end was pointed, and along the dome of the bladder five areas of superficial ulceration were observed which suggested that the cranial end of the metallic foreign body altered position from time to time. No vaginal discharge was noted on pelvic examination. The distal third of the metallic object and the stone could be palpated.

Confirmation was sought of the clinical suspicion that the metallic object had arrived at its destination through inexpert efforts to induce abortion. The patient denied that any such attempt had been made but did admit to consuming in early pregnancy an unknown quantity of liniment when advised by friends regarding its ecbolic efficacy. All she induced, however, was an upset stomach. Since one could readily visualize rupture of the bladder should labor start, the patient was advised to enter the hospital without delay for removal of the foreign body.

The patient's mother asked if it were possible for a piece of metal to travel from "the hip bone into the bladder." The mother stated that seven years previously, on Aug. 18, 1950, an open surgical procedure had been performed on the daughter's left hip, contradicting the daughter's previous denial of having had an operation. The mother also stated that four months postoperatively a piece of metal emerged from the outer aspect of the patient's left mid-thigh. Further examination revealed a fine scar on the posterolateral aspect of the left hip which had been missed when the patient was examined in the draped lithotomy position. A roentgenogram of the abdomen (fig. 2) revealed the orthopedic pin present in the bladder and one small pin still present in the left hip. The original films made after the hip-pinning were unfortunately not available for study.

On Sept. 23, 1957, the bladder was opened through a low transverse suprapubic incision. A Steinmann pin, 9.5 cm. in length and partially encrusted by a stone measuring 4 by 3 cm. in diameter, was found lying free in the bladder cavity. Some fibrous thickening was noted in the paravesical tissues, suggesting that the pin had burrowed its way through the acetabulum into the bladder. The patient had an uneventful postoperative course. The urethral catheter was removed on the fourth day, and the patient was discharged on the fifth postoperative day. A follow-up cystoscopic examination on Oct. 7, 1957, disclosed only mild residual trigonitis. The patient had an uneventful delivery on Dec. 11, 1957.

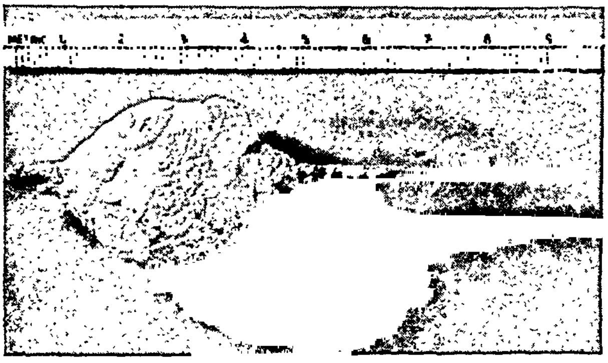

Fig. 1.—Steinmann pin removed from bladder.

Comment

The symptoms of a foreign body in the urinary bladder are basically those of any urinary bladder calculus. Symptoms may be delayed after introduction but are usually constant once begun. Pain is usually present and is often most severe when the patient is expressing the last few drops of urine. Dribbling and sometimes complete urinary obstruction cause the patient to seek medical help. If the foreign body is self-introduced feelings of guilt or shame may cause the patient to delay seeking medical help until the symptoms become totally unbearable. When the foreign body invades the bladder wall from without, extravasation frequently does not occur because a bed of dense scar tissue is laid down as the foreign body burrows and advances. The rapidity with which stone formation occurs depends to a great extent on the physical characteristics of the foreign body and the degree of local irritation it produces.

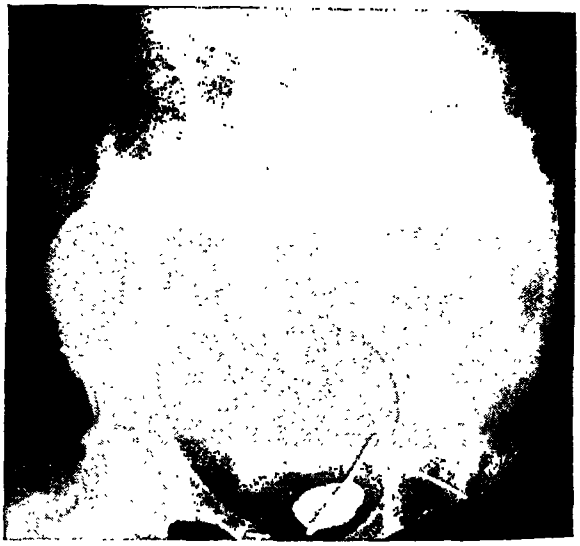

Fig. 2.—Preoperative roentgenogram showing bladder calculus, Steinmann pin, and fetal skeleton.

Summary

A Steinmann pin from a hip-pinning seven years previously migrated into the urinary bladder of a pregnant woman. The original orientation of the pin suggests that the pointed end first entered the bladder and that calcification of the distal end occurred only after the entire pin was intravesical, or nearly so.

The patient denied having had any operations in the past, and was therefore cross-examined regarding attempted abortion. The oral intake of liniment is not recommended as an effective abortifacient from this series of one.

926 S. W. Second Ave.

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SPECIAL ARTICLE

This is the first of three papers presented at the Midyear Conference of the American Hospital Association, Chicago, Feb. 4, 1959. The others will be published in THE JOURNAL, *June 13 and 20.*

THE JOINT A. M. A.–A. H. A. COMMITTEE ON PROFESSIONAL LIABILITY

Joseph F. Sadusk Jr., M.D., Oakland, Calif.

During the past decade, the problems of professional liability confronting both hospital and physician have become increasingly severe. Not only has the frequency of claims increased but also the amount of indemnities paid and judgments rendered. In some areas total losses now practically quadruple those of 10 or more years ago. This has resulted in an unprecedented rise in premiums for professional liability insurance, a manifestation of the increasing financial liability of the physician and hospital. Even more important is the indirect effect on the practice of the physician, not only inhibiting his use of the more serious and hazardous forms of medical and surgical treatment but also causing him to practice with one eye on his legal obligations. This is difficult since the practice of medicine generally still remains an art, rather than a business procedure or a purely scientific endeavor.

The problem reached such magnitude for the physician by 1954 that a number of resolutions were presented to the House of Delegates of the American Medical Association by its component state medical societies, requesting advice and assistance in the field of professional liability. In December, 1954, the Board of Trustees of the A. M. A. directed the Law Department of that organization to carefully review the problem and to plan and initiate appropriate studies on the subject. Such studies were made and progress reports were regularly presented to the Board of Trustees. These analyses covered state insurance laws and regulations, state statutes of limitations, the type of reported cases, professional liability claims involving physicians in government service and in civilian practice, surveys of pertinent state legislation, surveys of state and national medical societies, and, finally, the preparation and publication of special articles on the subject of professional liability.

These and studies elsewhere, especially in California, clearly indicated that the majority of claims against physicians arose in hospitals. The findings were striking, revealing that whether studies were made on a county, state, or national basis, 70% of such malpractice claims occurred in the hospital. This was interpreted as a manifestation of the fact that serious and difficult medical and surgical problems are carried out in the hospital rather than in the doctor's office or in the patient's home.

At the same time the California Hospital Association, by forming a group insurance program in the field of hospital liability, obtained invaluable data on factors leading to claims against the hospital. These findings, along with the findings of the Law Department of the A. M. A., led to a resolution adopted by the House of Delegates of the A. M. A. in June, 1957, directing the Board of Trustees to consider the advisability of entering into discussion with representatives of the American Hospital Association with the objective of formulating and implementing an effective joint in-hospital safety and accident prevention program. The A. M. A. Board of Trustees voted to approve the appointment of a joint committee shortly thereafter.

On Oct. 2, 1957, at the invitation of the American Medical Association, the Board of Trustees of the American Hospital Association took the necessary formal action to enable the appointment of a joint committee of the two associations on the subject of professional liability.

Six members were appointed to the Joint Committee, three each from the A. M. A. and the A. H. A. Dr. H. Close Hesseltine of Chicago, Dr. W. M. Nebeker of Salt Lake City, and Dr. Joseph F. Sadusk Jr. of Oakland, Calif., were assigned by the American Medical Association and Dr. Ray E. Brown of Chicago, Dr. August H. Groeschel of New York, and Mr. James E. Ludlam of Los Angeles were assigned by the American Hospital Association. The Joint Committee first met in session in Chicago on Oct. 17, 1957, assisted by Mr. Alanson W. Willcox, counsel for the American Hospital Association, and Mr. C. Joseph Stetler, Director of the Law Department of the American Medical Association. At that meeting, Dr. Sadusk was elected Chairman and Mr. Stetler was elected Secretary.

The directive for the Joint Committee was simple and broad in nature. The committee was asked to formulate and implement an effective in-hospital

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Chairman, Joint American Medical Association–American Hospital Association Committee on Professional Liability.

safety and accident prevention program with a view to improving patient care, preventing accidental injury to patients, and lowering to an irreducible minimum grievances, claims, and suits against members of the medical staff and the hospital. Reports of the meetings of the Joint Committee have been received and accepted by the House of Delegates of the American Medical Association at its December, 1957, and June, 1958, meetings.

Joint professional liability problems of the physician and the hospital have been discussed in detail at meetings of the committee. Collection of facts and statistics dealing with professional liability and education in the field have been discussed on a local and national basis. A report concerning the history and present status of the legal liability of charitable hospitals, by state, has been submitted to the journals of the two associations for publication. A similar paper on legal liability of governmental hospitals has also been prepared.

Through one of the A. H. A. members of our committee, and with the guidance of the committee, the Farmers Insurance Exchange of California is conducting an intensive survey of the professional liability experience of 200 hospitals in California covered by the state hospital group insurance program. This study, which will cover the last four years, is intended as a pilot survey. It is hoped that the results and the system perfected will enable the committee to recommend a mechanism for similar analyses by other state groups and by individual hospitals.

Much discussion has taken place on the subject of education in professional liability for the physician and the hospital, particularly with the view of leading both the professional and the administrative staff to realize the joint nature of their problems. Careful consideration has been given to the formation of joint committees on professional liability at state and local levels. Also, discussion has brought out the need for methods of indoctrination and education at state and local levels, with educational material being prepared at the national level for guidance at the grass roots level.

Such is basically the purpose of this discussion today. As a primary source of educational material, the Joint Committee has planned, through the kind assistance of the Wm. S. Merrell Company of Cincinnati, a series of films on various aspects of the professional liability problem for hospital and physician. One such film, entitled "No Margin for Error," has already been completed and will receive its première showing today. This film takes up in-hospital liability problems and is directed not only to the physician's professional liability but also to the hospital and to its employees. The joint nature of such problems has been emphasized. This first film is necessarily general in scope; as time goes along, future films will doubtless be along more specific lines. The film may be obtained for showing in hospitals from the respective film libraries of the A. M. A. and the A. H. A.

The committee has considered that there is a need at the local hospital level for a joint hospital medicolegal education committee to provide all persons engaged in the care of patients with an understanding of the various factors which are or could be involved in the occurrence of accidental injury or harm to the patient. Details of this recommendation will be presented by Dr. Groeschel of the Joint Committee. Also, Mr. Ludlam will present our thoughts on similar committees at the state level.

Our deliberations to date have certainly emphasized the need for a joint effort of physician and hospital at all levels from national down to local. It is hoped that our committee's efforts will lead to the formulation of a sound prevention program which can be implemented by constituent associations and by individual hospitals.

4725 Telegraph Ave.

SURVIVAL AFTER HIP FRACTURE.—A comparison of the life expectancy of our patients following fracture with the life expectancy of a group . . . similar to our patients in age, sex, and race showed that after the first 6 months the life expectancy of our patients with fracture is not appreciably less than that of the general population, which is about 11 years. These conclusions would lead us to suggest that if patients with fracture of the hip can be supported through the first 6 months, they should live for several years. Although it is true that the weak members of the fracture sample would tend to die in the first 6 months, yet 70 per cent of our patients lived for 6 months. Every effort should be made to see that these patients are sustained to the maximum. We suggest that the use of heparin for the prophylaxis of pulmonary embolism, the liberal use of whole blood before and during operation (especially in the patients with trochanteric fractures), and the use of antibiotics for the prophylaxis of pulmonary and wound infections are helpful.—William T. Fitts Jr., M.D., Herndon B. Lehr, M.D., Stanley Schor, Ph.D., and Brooke Roberts, M.D., Life Expectancy After Fracture of the Hip, *Surgery Gynecology & Obstetrics,* January, 1959.

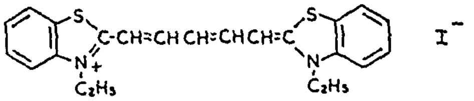
COUNCIL ON DRUGS

NEW AND NONOFFICIAL DRUGS

The following descriptions of drugs are based upon available evidence and do not in any case imply endorsement by the Council.

H. D. Kautz, M.D., *Secretary.*

Dithiazanine Iodide (Abminthic, Delvex).—3-Ethyl-2-[5-(3-ethyl-2-benzothiozolinylidene)-1,3-pentadienyl]benzothiazolium iodide.—The structural formula of dithiazanine iodide may be represented as follows:



Actions and Uses.—Dithiazanine iodide, introduced commercially in 1958, is a blue cyanine dye which is used clinically as an anthelmintic. The drug possesses an amidinium ion system, a distinctive chemical configuration characterized by a quaternary nitrogen separated from a tertiary nitrogen by a resonating or conjugated carbon chain of alternate double and single bonds; this resonating amidinium ion system is apparently essential for anthelmintic activity. Cyanine dyes as a class are sparingly soluble and poorly absorbed from the gastrointestinal tract. The high levels in the intestine after oral administration of dithiazanine exert an inhibitory effect on the anaerobic metabolic reactions of certain intestinal helminths, thereby producing a chemotherapeutic effect against susceptible parasites.

Dithiazanine is highly active against Trichuris trichiura (whipworms) and Strongyloides stercoralis. Cure rates ranging from 72 to 100% have been reported in trichuriasis and from 62 to 100% in strongyloidiasis. The drug is far more effective than previous modes of therapy in either of these worm infestations, i. e., hexylresorcinol retention enemas for Trichuris organisms and intravenously administered gentian violet for Strongyloides infections. In responsive patients, therapy with dithiazanine effects a cure rather than merely removing most of the worms. Hence, it is considered the drug of choice for the treatment of trichuriasis and strongyloidiasis.

Dithiazanine is about as effective as piperazine for the treatment of pinworms (Enterobius vermicularis) and roundworms (Ascaris lumbricoides). Since the use of dithiazanine is associated with a much higher incidence of gastrointestinal side-effects than is therapy with piperazine, the latter agent is considered preferable for these infestations. Therapy with dithiazanine for pinworms or roundworms should be reserved for those patients in whom a course of treatment with piperazine has failed to eradicate the parasites. However, dithiazanine should prove to be highly useful as a single agent for the treatment of multiple worm infections, such as ascariasis and trichuriasis, which frequently occur in the same patient.

Dithiazanine, used either alone or in combination with tetrachloroethylene, has been tried for the treatment of hookworm infections due to Necator americanus. Although the preliminary clinical trials have suggested some degree of chemotherapeutic effectiveness, the drug appears to be inferior to tetrachloroethylene for this purpose. Hence, its use in hookworm infections is considered experimental. There is, likewise, inadequate evidence to establish the usefulness of dithiazanine in dwarf tapeworm (Hymenolepis nana) parasitism.

Serious toxicity has not been encountered during the clinical trials of dithiazanine, an effect attributable to its almost complete lack of absorption from the gastrointestinal tract. The drug does, however, exert a local irritant effect on the gastrointestinal mucosa. Thus, nausea, vomiting, and anorexia occur frequently; abdominal cramps and diarrhea may also be encountered. For this reason, the drug is probably best administered with meals. Since cyanine dyes as a class are highly toxic when given parenterally, dithiazanine should not be given in any condition in which its gastrointestinal absorption might conceivably take place. In view of past experience that other cyanine dyes can cause kidney damage, dithiazanine should be used cautiously in patients with renal disease. The drug is obviously contraindicated in any condition that may be aggravated by vomiting.

Dosage.—Dithiazanine iodide is administered orally. The optimal daily dose is 45 mg. per kilogram of body weight (20 mg. per pound) with a maximum daily dosage of 600 mg., administered in three divided doses, for 5 to 10 days in trichuriasis, for 5 days in ascariasis and enterobiasis, and for 7 to 21 days in strongyloidiasis.

Preparations: tablets 50, 100, and 200 mg.

Eli Lilly and Company cooperated by furnishing scientific data to aid in the evaluation of dithiazanine iodide.

COMMITTEE ON TOXICOLOGY

Accidental poisoning from a compound or group of compounds is directly related to accessibility of the agent and lack of awareness of its toxic potentialities. This is no more strikingly demonstrated than in the record of poisoning from medicinal iron preparations during the past century. Over 100 years ago, Orfila, the father of the modern science of toxicology, pleaded for recognition of the toxicity of ferrous sulfate because of the then increasing number of poisonings by iron salts. Later, the medicinal value of iron preparations fell into disrepute, and iron poisoning vanished with the disappearance of these preparations from the home.

Orally administered iron preparations have again returned to medical favor, but a general lack of awareness of the hazard of overdoses, especially in small children, persists. Accordingly, the Committee has adopted the following report to acquaint the medical profession and, through them, the general public, with the toxicity of iron salts and their potentialities for harm when ingested in excessive amounts.

Bernard E. Conley, Ph.D., *Secretary.*

ACCIDENTAL IRON POISONING IN CHILDREN

Within the last 10 years a considerable number of small children have been poisoned from the accidental ingestion of ferrous sulfate tablets. The potential toxicity of ferrous sulfate has received editorial attention in recent years, and physicians have been asked to adopt a more cautious attitude about the supposed safety of iron preparations. In view of the accumulated reports of poisoning by ferrous sulfate and other iron salts such as ferrous and ferric chloride and ferric ammonium citrate and the current popularity of this form of therapy, it is important that physicians appreciate the potential toxicity of these compounds and warn patients to keep tablets out of the reach of children.

The incidence of poisoning by iron salts seems to be related to the status of iron therapy in any given period. Cases of accidental and homicidal poisoning from iron salts were widely reported in the literature of the middle 19th century. Reports of accidental iron intoxication did not appear again in print until 1934, and since 1947 they have appeared with sufficient frequency to warrant editorial attention.

Until the last decade of the 19th century, iron therapy was widely employed in the treatment of hypochromic anemias due to body-iron deficiencies. At the turn of the century a definite change in attitudes toward the value of iron therapy occurred as the result of the belief that inorganic iron was not absorbed from the gastrointestinal tract. The small doses of iron salts then used had little therapeutic effect, and the value of iron fell into disrepute until the second decade of this century. Then, the two fundamental principles of iron therapy previously set forth by Sydenham and Blaud, namely, large doses and the greater potency of ferrous salts, began to be reconfirmed through use.

In recent years, ferrous sulfate has been used extensively for the treatment of iron deficiency anemia, and even some blood banks give the tablets routinely to donors. The more widespread use of this compound has increased the opportunity for accidental poisoning in young children. Candy-coating of this medication appeals to small children, thereby magnifying the hazard. The magnitude of the hazard is evident in the vital statistics on fatal accidental iron poisoning which have been recorded in the United States and Great Britain in recent years.

Clinical Experience

In Great Britain, ferrous sulfate is considered the most important childhood poison, being comparable to aspirin in the United States as the greatest single cause of poisoning in small children. Two decades ago (1930-1939) only two children died in Great Britain from ferrous sulfate poisoning. During the recent decade (1940-1949) this drug killed 17 children, with two more deaths attributed to unspecified iron tablets. Although full information is not available for recent years, the direction of the trend of iron poisoning is evident from British vital statistics for 1950-1953. These records indicate that 32 accidental deaths due to ferrous sulfate poisoning occurred in children.

Although precise data for a comparable period for the United States are not available, eight deaths are recorded in the American literature for the period 1947-1954. Examination of mortality data recorded with the United States' National Office of Vital Statistics disclosed 30 deaths from ferrous sulfate in children for the years 1949 through 1956.

Unfortunately, nationwide morbidity data are unavailable. Examination of the records of the New York City Poison Control Center revealed that ferrous sulfate was involved in 35 incidences reported during the past two and one-half years. The Washington, D. C., chapter of the American Red Cross tabulated only six nonfatal reports during the same period. An additional 68 cases were reported from 16 other centers responding to a questionnaire directed to poison control activities. These data suggest that, although poisoning from oral ingestion of medicinal iron preparations is not as important a cause of injury in the United States as in Great Britain, prudent use of such preparations requires that warning or caution statements about the hazards to children be required of all oral iron preparations with a history of accidental injury. For several years, British manufacturers have employed warnings of this type on the labels of containers for iron sulfate capsules and tablets. Canadian food and drug regulations also require caution statements on ferrous sulfate capsules or tablets.

Mechanism of Action

The mechanism of action in iron poisoning is not known. Pathological findings have failed to give a satisfactory explanation for death. Opinions are divided as to whether the fatal outcome is due to shock secondary to local tissue damage to the gastrointestinal tract, to systemic effects following the passage of large quantities of iron into the blood stream, or to the metabolic effects of absorbed iron resulting in respiratory collapse.

One of the unique features of iron metabolism is that iron has no organ of excretion. Iron released from the catabolism of iron compounds is not excreted and must be fed back into anabolic iron pathways. Overloading with parenterally administered iron is not compensated for by increased fecal or urinary excretion. Iron found in the feces represents only unabsorbed iron, and the intestine has no power to regulate, through excretion, the amount of iron in the body. Urinary excretion of iron is negligible, and increased ingestion of iron is not accompanied by elevated urinary excretion. Thus, the capacity to regulate the amount of iron in the body lies in the absorption mechanism.

Iron is absorbed by the mucosal cells of the intestinal tract. It is absorbed more readily in the ferrous than in the ferric form. How iron passes through the mucosal cell and into the blood stream is unknown. The absorption of iron is not a question of simple diffusion across a membrane but involves a metabolic transportation through the intestinal mucosa. Presumably, the mucosal cell regulates the rate of absorption from the gastrointestinal tract and seems to act as a barrier to the rapid entrance of iron into the circulation.

The pathological picture is usually that of hemorrhage and necrosis of the stomach and intestinal mucosa. The liver is frequently involved, showing mild, cloudy swelling to small areas of complete necrosis. Among some survivors, delicate fibrosis of the liver and pyloric stenosis have been described. In most cases there has been a marked dilation of the right side of the heart, with pulmonary congestion and occasional hemorrhage. There have not been any particular abnormal findings in other organs of the body.

Symptoms and Treatment

There are three critical phases in iron poisoning: an early acute phase of shock that occurs within a few hours after ingestion; a recurrent phase that appears 20 to 48 hours after ingestion; and occasionally a late phase of gastric scarring and contracture, with pyloric obstruction appearing about a month later.

Death has occurred from the ingestion of ferrous sulfate in doses ranging from 40 to 1,600 mg. per kilogram of body weight. Hoppe has estimated the fatal dose for a child 2 years old or younger to be 900 mg. per kilogram of body weight.

The principal manifestations of poisoning are vomiting and circulatory collapse. Lethargy, vomiting, fast and weak pulse, low blood pressure, and coma appear within one-half to one hour after ingestion. These symptoms may disappear after 4 to 6 hours, followed by a 6-to-24-hour asymptomatic period in which the child seems to improve rapidly. A second crisis then occurs, with cyanosis, vasomotor collapse, pulmonary edema, coma, and death within 12 to 48 hours.

Treatment is mainly symptomatic and is directed toward removing the iron and combating shock. Milk should be given immediately and vomiting induced. The stomach should be lavaged with a 5% aqueous solution of monosodium phosphate or disodium phosphate. Two or three ounces of the phosphate solution should be left in the stomach of a child 1 or 2 years old. (Proportionately greater amounts of these drugs may be given to older patients.) Bismuth subcarbonate, 200 mg., may be given every four hours to young children. A solution of 5% glucose in saline solution should be administered intravenously to correct dehydration. Transfusion is initiated with plasma or whole blood if shock is severe. Edathamil calcium-disodium is administered intravenously, and oxygen is given as indicated. Exchange transfusions have proved valuable in severe poisoning. Antibiotics are administered as prophylaxis against pneumonia and other intercurrent infections.

Conclusions

The approach often recommended to correct most poisoning hazards is to substitute less noxious agents or to restrict use so that the hazards are reduced or eliminated. Iron sulfate and other iron salts, which have produced injury, may ultimately be replaced by safer iron compounds, provided the substitutes are equally effective and not too expensive. Restrictions on use, although theoretically attractive, are not always feasible in practice, especially for a valued and time-tested medicinal agent. A requirement that ferrous sulfate and similar hazardous iron salts be labeled with a caution statement about the hazards of excessive doses, especially to children, seems to best serve the public interest at this time.

THE JOURNAL
OF THE AMERICAN MEDICAL ASSOCIATION

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IS FAMILIAL PERIODIC DISEASE A NOSOLOGICAL ENTITY?

A case report in this issue of THE JOURNAL, page 653, by Alkalay and co-workers calls attention to a syndrome that seems to be in the process of being differentiated from the pyrexias of unknown origin. In 1948 Reimann [1] grouped together under the term periodic disease a series of patients with somewhat diverse symptomatology, characterized by periodic recurrence of symptoms over a long period of time and without known cause. The findings most frequently noted were recurring fever, abdominal pain, and joint pain. Similar cases have been described by others under such terms as benign paroxysmal peritonitis, periodic peritonitis, periodic arthralgia, periodic abdominalgia, and familial Mediterranean fever. Heller and associates [2] proposed the following diagnostic criteria: (1) attacks of fever, usually of short duration, recurring at varying intervals over the course of many years; (2) painful manifestations usually but not always with each attack located in abdomen, chest, joints, or skin; and (3) no evidence of any known causative factor. About one-third of the patients develop erythematous skin lesions and about one-fourth develop proteinuria without obvious cause.

Similar symptoms have been found among close relatives of about 60% of the patients described in the literature. Reimann and Angelides [3] described 23 affected persons in five generations of a single family, with arthralgia being the outstanding symptom. Genetic study of this family and of several others suggests the action of an autosomal dominant gene. On the other hand, Mamou and Cattan [4] described 10 cases in first cousins and their children, but with two normal sisters who were mothers of the affected sibships. This observation, which has been supported by others, suggests that the condition can be transmitted to their children by apparently healthy persons. This phenomenon, which would be described by geneticists as reduced penetrance of the gene, at least suggests the possibility that both genetic and environmental factors might be concerned in the etiology of this condition. In addition, familial periodic disease seems to have a peculiar ethnic distribution, occurring primarily in peoples of the Mediterranean Basin, and in their descendants in other parts of the world. The vast majority of cases have been found in Jews, Armenians, and Arabs, with some cases in Turks and Italians.

The picture that seems to be evolving is that of an inherited disease of unknown mechanism and apparently limited ethnic distribution that should be considered in the differential diagnosis of fevers of unknown origin. The frequent occurrence of renal involvement suggests that this condition may also be responsible for some of the obscure cases of nephritis. Additional studies with a combined genetic and clinical approach are needed to delineate this syndrome more exactly and to elucidate the mechanisms involved in its development.

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NUCLEAR SEX

In 1949, Barr and Bertram [1] demonstrated a sex difference in nuclear morphology in the neurones of the cat. Subsequently similar though possibly not homologous distinctions were shown to exist in cells of many other tissues in a variety of species including man. In recent years, the sex chromatin test has been widely used in studies on sexual dysgenesis and neoplastic growths and has provided a useful tool in the field of experimental embryology. Various cell preparations have been used for the test including buccal and vaginal smears, amniotic fluid smears, skin biopsy specimens, and leukocytes. In somatic cells other than leukocytes a characteristic chromatin mass is found on or close to the nuclear membrane in from 25 to 85% of cells from genetically female persons but in less than 10% of cells from genetically male persons. This mass may represent the two X chromosomes of the female, though this is by no means established nor is there any explanation for the occasional appearance of this structure in male cells.[2] The sex distinction in the leukocyte is manifested by a small drumsticklike structure present in up to 6% of leukocytes of genetically female persons but absent from leukocytes of genetically male persons.[3] The significance of this structure has not been determined. With the possible exception of certain neoplastic growths,[4] there appears to be a consistent agreement in chromatin sex among the various tissues of a given person; the pattern is apparently established early in the embryonic development, persists through the life of the person, and is uninfluenced by hormone administration or deprivation.

It is now well established that the influence of genetic, environmental, or hormonal factors during development can lead to a dichotomy between genetic and somatic sex. Thus dysgenesis of the primordial germ cells may apparently lead to either Turner's syndrome or Klinefelter's syndrome depending, respectively, on whether the germ cells disappear completely or are merely substantially reduced.[5] In the former case, the phenotype is invariably female though the genetic sex has been found to be male in the majority of subjects examined. In the latter case, the medullary component of the fetal gonad is able to differentiate and a testis results, capable of secreting testosterone and even of displaying spermatogenesis. Male secondary sex characteristics develop regardless of the fact that the genetic sex has proved to be female in many of the clinically recognized cases. In the event that the number of primordial germ cells approaches the normal, true hermaphroditism may result, the persons being of either male or female genetic sex. While it is generally agreed that these forms of sexual dysgenesis must arise very early during development, opinions differ as to whether they are genetically determined disorders[6] or acquired ones.[5] Another abnormality, the testicular feminizing syndrome, is known to be the result of a maternal hereditary trait which manifests itself early in the third month of pregnancy by suppression of the male inductive and endocrine capacities of the testes. Genetically male offspring of mothers bearing this trait develop female or mixed male and female secondary sex characteristics. Female offspring develop normally but one-half will be carriers of the trait.

A third type of defect, congenital adrenal hyperplasia, arises from a genetic defect in the synthesis of adrenal cortical hormones which leads to an enhanced production of androgenic substances. This results in various degrees of virilization particularly apparent in female babies. Fortunately this condition usually responds readily to depression of endogenous adrenocorticotropic hormone secretion by corticosteroid therapy. A somewhat similar form of female pseudohermaphroditism has been reported to occasionally occur in female children born to women receiving progesterone during pregnancy.[7] In these cases, it has been suggested either that the placental barrier is abnormally permeable or that the mothers degrade progesterone abnormally, giving rise to more potent androgenic substances. Determination of the genetic sex is of considerable aid in the diagnosis of those essentially treatable forms of pseudohermaphroditism.

In lower vertebrates, sex reversal has been shown to be compatible with reproduction. Thus, the genetically male Xenopus can be changed to a normally behaving, reproducing female frog.[8] As yet complete sex reversal has not been recorded in man, though the presence of active spermatogenesis in certain genetically female patients with Klinefelter's syndrome suggests this possibility. Recognition in man would be difficult since sex reversal usually only comes to the attention of physicians when patients seek medical advice for such conditions as sterility. Recently Moore[9] has reported that in 1,911 newborn anatomically male infants, 5 had sex chromatin patterns typical of females while in all of 1,804 anatomically female infants the chromosomal pattern was characteristically female. An even higher incidence of sex reversal has been reported by Ferguson-Smith[10] in prepuberal mentally retarded children. Moore suggests that if all five of the chromatin-positive males develop testicular dysfunction before puberty, the incidence of the disorder must be higher than is generally thought. Alternately he postulates that at least some of the five may develop into normal-appearing, fertile males. Recognition of such sex-reversed persons is currently being attempted by cytological screening of fathers of families composed of large numbers of girls only, since genetically female persons mated to normal females could be expected to have only female offspring.[11] The possibility of the existence of fertile sex-reversed persons serves to stress the fact that the ultimate determination of sex should not be based on chromatin patterns alone but on a consideration of the total psychophysical personality.[12]

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THE PRESIDENT'S PAGE

A MONTHLY MESSAGE

In this final message of mine to the 175,000 members of the American Medical Association I am extremely pleased to report to you that I believe the state medical societies are meeting one of medicine's most important challenges—the health care needs of the aged—with speed, vigor, and imagination.

In the last few months I have had the opportunity to see firsthand how our state medical associations are moving to solve this important matter now before the profession. I have heard the discussions and debate of state committees on aging and of houses of delegates. I have watched hundreds—even thousands—of physicians toiling over and thinking out new and better medical care plans for their fellow men—the senior citizens of the United States.

Since the A. M. A. House of Delegates unanimously adopted the proposal asking physicians to accept a level of compensation that would permit the development of low-cost health insurance and prepayment plans, our state associations and their members have seized the opportunity before them and have implemented this decision.

In full cooperation with Blue Shield plans across the nation low-cost coverage for older persons has been developed in many areas. Some of these plans now are enrolling those over 65 years of age. Others soon will begin their enrollments.

In a realistic fashion these states have come up with plans that will provide tangible help and needed security and assurance to our aged. They have done so not merely because of the essential urgency of the situation but, more important, because here was an opportunity for the physician and his organized medical society to serve patients—millions of them over 65 years of age.

Without a doubt, this dedicated action on the part of physicians everywhere has been the highlight of my term of office. It has been a most heartening experience. Furthermore, I believe that every physician who has taken part in this excellent effort to develop a sound and workable plan in his state has been rewarded richly.

I cannot thank personally every physician who has taken part, or who will participate, in this program of helping the aged to help themselves in meeting their health care needs. However, through this medium I congratulate each of you for your past, present, and future good work.

Naturally, I am aware that what we already have done does not necessarily make medicine's program for the aged a success. Our ultimate and real success will be measured in the number of older persons who are covered by voluntary health insurance and prepayment plans and the extent of that coverage.

But a solid foundation has been laid. We now need to build on it. Furthermore, we need to keep the profession mobilized and alert on the whole matter of the aging.

I also hope that all our state societies will display their further interest by enlisting community support and by providing leadership in obtaining adequate nursing home and homemaker facilities for the aged at the community level.

In his famous passage from "Rabbi Ben Ezra" the poet Robert Browning wrote:

"Grow old along with me! The best is yet to be."

For the sake of all of the nation's aged and of future generations of senior citizens, I hope that we—the physicians of the United States—will continue to do our utmost to ensure that truly "the best is yet to be."

Gunnar Gundersen, M.D.
La Crosse, Wis.

ORGANIZATION SECTION

REPORTS OF OFFICERS

The following reports will be presented to the House of Delegates of the American Medical Association at its session to be held in Atlantic City in June.

REPORT OF BOARD OF TRUSTEES

To the Members of the House of Delegates of the American Medical Association:

The following report of the Board of Trustees is respectfully submitted:

Financial Statement

The official 1958 financial reports of the Association's accountants appear as part of this report.

At its meeing on April 24-26, 1959, the Board of Trustees adopted, on recommendation of the Association's accountants, a form of balance sheet which constitutes a revision, particularly with respect to reserves and fund balance, and which was made applicable to the accounts as of Jan. 1, 1959. The letter from the accountants, transmitting the revised balance sheet, indicated that "as further funds are set aside and reserved, entries should be made in the accounts and so shown in the financial statements that the resources of the Association which have been authorized to be set aside by the Executive Committee are clearly indicated. We approve of the revised form of presentation and it is our understanding that this will become the official form of balance sheet presentation for American Medical Association, effective January 1, 1959."

The above revised balance sheet also appears as part of this report.

Report on Matters Referred by House of Delegates

Voluntary Health Agencies.—In December, 1958, the House of Delegates adopted a substitute resolution stating that the American Medical Association neither approves nor disapproves of the inclusion of voluntary health agencies in united fund drives and that the Board be requested to arrange a top-level conference with the voluntary health agencies, the united funds, and other parties interested in the raising of funds for health causes, with the view of resolving these misinterpretations and other difficulties in this area.

After careful consideration of the resolution and the intent of the House which was interested as a desire to clarify the position of the American Medical Association with respect to fund raising, the Board of Trustees was of the opinion that such clarification could be accomplished by sending a letter to the organizations concerned. The letter, outlining the December 1958 action of the House of Delegates, was mailed in March 1959.

Armed Forces Institute of Pathology.—In accordance with the action of the House of Delegates in December, 1958, a letter was sent to the Secretary of Defense requesting that provision be made for general or flag rank for the Director of the Armed Forces Institute of Pathology during his tenure of office.

A reply from Charles C. Finucane, Assistant Secretary of Defense, Manpower, Personnel and Reserve, dated March 26, 1959, indicated that the views of the Military Departments on the resolution were obtained; that the Departments, while expressing full recognition of the importance of the position and the necessity for capable service representatives occupying it, are unanimous in the opinion that the position should not be designated for general/flag officer rank. The reasons cited are (1) that the specialist qualifications which the Director must possess preclude the routine assignment of a general/flag officer to the position; (2) the Services are unable to accommodate within present general/flag officer authorizations a number of positions for which the assignment of a general/flag officer is considered fully justified. Their capability to meet requirements for general/flag officers outside their own areas is limited to filling only those positions related to the highest priority missions. Accordingly, it is the view of the Department of Defense that the establishment of the position of the Director of the Armed Forces Institute of Pathology for general/flag rank is not desirable.

Memorial Stamp Commemorating Anniversary of First Successful Oophorectomy.—A telegram was sent to the Postmaster General requesting, in accordance with the action of the House of Delegates in Minneapolis, that a commemorative stamp be issued in honor of Dr. Ephraim McDowell who performed the first successful oophorectomy on Dec. 25, 1809, at Danville, Ky. Mr. L. Rohe Walter, Special Assistant to the Postmaster General, replied that a number of requests for such a stamp were received and given complete and careful consideration by the Citizens' Stamp Advisory Committee; that while the Committee appreciates the significance of the great contribution made by Dr. McDowell, it was not possible to include recommendation for this stamp in the 1959 schedule.

Referrals.—Other matters referred by the House of Delegates to appropriate councils, committees or departments of the Association have been so referred. As soon as reports are available from these groups, they will be transmitted to the House of Delegates.

Committee on Preparation for General Practice

In June, 1958, the Board of Trustees referred to the House of Delegates for its information a progress report of the Committee on Preparation for General Practice, for the purpose of obtaining comments and suggestions from the members of the House in order to aid the Committee in developing a final report at a later date.

The following final report and recommendations of the Committee on Preparation for General Practice was approved by the Board of Trustees and is submitted to the House of Delegates for adoption:

Introduction.—At the meeting of the House of Delegates of the American Medical Association in Seattle, Nov. 27-30, 1956, the Committee on Medical Practice presented a report containing five instructions. The report was considered by the Reference Committee on Insurance and Medical Service and on its recommendation was adopted by the House. The report, in its instructions 3 and 4, recommended that a study group be formed to consider the best background preparation for general practice.

The Executive Committee of the Board of Trustees, at its meeting on Dec. 14, 1956, voted that the Council on Medical Education and Hospitals address itself to instructions 3 and 4 and requested the Council to form a study group of representatives of the Council, the Association of American Medical Colleges, the American Academy of

General Practice, and representatives of the specialty areas, and proceed "to analyze objectively and make recommendations as to the best background preparation today for general practice."

Subsequently, the Committee received a related assignment from the House of Delegates during the New York meeting, June 3-7, 1957. At the time that the Reference Committee on Medical Education and Hospitals considered the reports of the Klump Committee on General Practice Prior to Specialization, it recommended discharge of that Committee and also "that the newly organized committee to study the best background preparation for general practice, in its long-term cooperative study with appropriate groups, give full consideration to the importance of a broad background of training and experience for all physicians in the care of the patient as a whole and of the family as a unit."

The first meeting of the Committee on Preparation for General Practice occurred Jan. 18, 1957. There have been subsequent meetings, as follows: Subcommittees—May 9, June 28-29, and Oct. 20, 1957. Committee meetings—May 10, Sept. 14 and Dec. 5, 1957; Feb. 22-23, May 17, and Sept. 13, 1958, and March 20-21, 1959. Discussions have been held with various major specialty groups in order to secure the benefit of their thinking in the deliberations of the Committee.

General Considerations.—The Committee undertook its assignment in full recognition of the need for a long range objective study regarding what basic educational background would best prepare future physicians for general practice. This immediately raised questions about the future nature of such practice in the light of the needs of the people as well as the changing dimensions of medical knowledge.

After careful thought and study of pertinent data, the Committee has concluded that the marked trend toward what is called full time specialty practice will be of continuing significance. As knowledge important to medicine continues to increase, the further development of specialism and its related tools and techniques will also take place. Although the availability of such specialty service is essential to good medical care, it is believed that it is similarly important that the broad, general outlook in medicine also be retained.

The Committee is of the opinion that the needs of the public are well served through comprehensive medical care. By its very nature, such care is based necessarily upon a close interpersonal relationship that most readily develops through long association between a physician and a patient. To have greatest significance, this close relationship also involves the physician with his patient's environment and, most particularly, with his family.

There is a general awareness of the changing nature of society. It is proper and necessary that the pattern of medical care adapt itself to fulfill best its role in this changing order. An unknown degree of such adaptation, not measurable in available data, has already taken place.

It is recognized that the approach to medical practice with the humanistic concept of and concern for the "whole patient" is and indeed should be characteristic of all physicians whether specialists or not. However, the concept of comprehensive medical care, as used here, implies the active performance of direct service over broad areas of medicine and the availability of this broad service for all patients. The Committee believes that further changes in the pattern of medical practice and of graduate study for practice will be required to meet successfully the challenges of this kind of general medical care in the future.

It does not seem likely that the general practitioner, the internist, or other specialist as commonly conceived today will be ideally prepared to fulfill this role in the future. To do so, the general practitioner of the future should have a deeper and more extensive graduate medical education than is presently available. And if the internist were to assume this role, then his training should be broadened in preparation for the assumption of a more comprehensive and continuing responsibility for the health of the individual and his family regardless of age. Thus, there are two possible approaches to the basic preparation of physicians for family practice; namely the designing of a new high quality graduate program specifically for the preparation of family physicians, or the broadening of the training given in existing residencies in internal medicine, such as by inclusion of training in pediatrics, the primary management of trauma, etc. The proposed program here set forth is concerned with the former. It is the hope of the Committee that appropriate groups will give consideration to the latter. It may well be to the advantage of the medical profession and the public that both approaches be used simultaneously.

In considering preparation for this type of medical practice in the future, the Committee devoted much thought to the titles that should be used for such a physician and such a medical practice. Because the emphasis is on the medical care of the family regardless of age and because of the wide acceptance and stature of the titles with the public, such a physician could most appropriately be designated a family physician and the field as family practice.

For the working definition of the medical practice involved, the Committee adopted the following: "Family practice is that aspect of medical care performed by the Doctor of Medicine who assumes comprehensive and continuing responsibility for the patient and his family regardless of age."

The educational program proposed for future family physicians is intended to prepare them to provide services to patients irrespective of age over broad areas of medicine and to coordinate specialty consultation and care according to the peculiar needs which their patients' problems may require. The Committee believes that there will be an increasing need for the family physician who is prepared to provide these services.

The Committee has given attention to the trend toward group practice. This trend, in itself, serves to emphasize the need for physicians prepared to serve as family physicians and for their inclusion in such groups.

The Committee believes it to be in the best interests of medical practice, the public, and the profession itself that every physician should be free to follow that field of medicine which most appeals to him and for which he is most suited by ability and temperament. He should be trained adequately for that field which he elects to follow. The student contemplating his future career in family practice should have avaiable to him recognized educational programs of high quality comparable to those existing in specialty areas.

Before addressing itself to the new graduate program, the Committee wishes to express certain viewpoints in regard to the medical school experience that is a necessary prelude to any graduate program. Regardless of what his future career may be, and this is not usually determined with finality early in his studies, the physician must have a sound balanced education in the sciences basic to medicine and in their clinical application. There is a common fund of knowledge and skills desirable for all graduates of medical schools. The provision of this common fund of knowledge and skills is the major objective of medical schools.

The educational program in a modern medical school exposes the student to specialty viewpoints. To maintain the objective of providing a sound, balanced medical education, it would seem highly desirable that the student be exposed also to the concept of family practice. Because general care is an important part of medical practice, medical schools should be encouraged to develop that phase of medical education centered around the patient, his continuing care, his environment, and the use of community resources, to the fullest extent compatible with the total educational program. Educational experiences emphasizing care of ambulatory patients should be an integral part of this program.

The Committee is cognizant of the many studies being conducted for the improvement of the medical school curriculum, and of the several experimental approaches being applied. These efforts are commended. The Committee believes that the entire medical curriculum warrants constant reappraisal and study for the purpose of developing educational programs which will better prepare the graduate to gain maximum advantage from the greater clinical opportunities of his graduate training. The medical profession has been fortunate in having medical school faculties who have subjected the educational objectives, methods and content to a continuing, intelligent, and critical appraisal. Careful, intensive study has frequently led to well planned changes. The Committee believes that the means of accomplishing further changes in undergraduate medical education should be left to the administrators and faculties of the schools, in whose ability and integrity the Committee has confidence.

The remarkable advances in medicine that have occurred and that will continue to occur have increased the difficulty and the complexity of family practice, as well as of the limited specialties. The responsibility of the family physician is a heavy one. It demands knowledge, alertness, agility of mind, and a wisdom born of education and experience. It necessitates the possession of a sound knowledge of the fundamentals of medicine as well as a synoptic knowledge of the basic principles of special fields. In view of this, as well as the pattern that has been followed successfully in the specialty fields of developing graduate educational programs beyond medical school, the Committee recommends that a new graduate educational program for family practice be developed.

The Proposed Basic Program.—The proposed two-year program presented below should assure the opportunity for adequate preparation of the future physician to provide medical care for all members of the family. It should be emphasized that the proposed program is conceived in its entirety as concerned with the preparation of physicians in the future for family practice. It should not be interpreted by hospitals or other institutions or organizations as having import for the training or privileges of general practitioners now in practice.

In recommending a new graduate program for the family practice of medicine, the Committee believes that primary consideration should be given to an educational experience enabling the physician to provide medical care for all members of the family irrespective of age. After determining that the period beginning at the time of receiving the M.D. degree is the most appropriate one for a new plan of preparation for family practice, the Committee agreed to concern itself with a minimal or basic program. Since the program is designed to fulfill a logical need, it is reasonable to anticipate that state board regulations, military obligations, and hospital staff policies and privileges will be altered to recognize the merits of this program.

Relationship to the Existing Internship.—The internship year as presently constituted cannot be considered as a component of this program for it would result in dividing it into two separate segments. The internship was designed many years ago to provide the initial contact with and responsibility for patients. Since the development of the medical school clinical clerkship, the internship no longer comprises such initial patient contact but rather it is now considered as one of several graded steps toward the assumption of total responsibility for patient care. Further, there is now general agreement that the one-year internship alone is inadequate as preparation for the practice of medicine. Indeed, the Committee believes the one-year internship actually encourages inadequate preparation for family practice.

The present values of the internship will be an inherent part of the proposed program, but cannot be separated out of it as a segment without weakening the greater values to be derived from dealing with the new program as a unified whole. The graduate program proposed as preparation for family practice is designed to be more comprehensive than the internship in regard to patient responsibility, educational content, and continuity of experience.

Minimal Requirements of the Basic Program.—Under the existing circumstances, the Committee believes that a period of at least two years of formal hospital training following attainment of the medical degree is necessary in preparation for the family practice of medicine. However, time alone cannot serve as a valid measure of educational adequacy. The two-year period would be minimal even where the other factors of educational quality and content are optimal.

Medicine and Pediatrics.—Since in usual instances the participant will enter this program immediately following graduation from medical school, it should include a minimum basic eighteen month period to provide experience in the diagnostic, therapeutic, psychiatric, preventive, and rehabilitative aspects of medicine and pediatrics in a very broad sense, including care of the newborn. In addition, there will be provided an elective period.

The graduate program of two years in preparation for family practice should be planned and implemented as a unified whole. Since the family physician is to provide continuing care, it is highly important that the preparation for this kind of practice be designed to assure suitable opportunity for the participant to study patients over relatively long periods of time. He should follow the patient, as necessary, in the outpatient service, into the home when this is practicable, and certainly from one hospital service to another (such as following his assigned patients from the medical or pediatric service through the surgical wards). There should be a maximum continuity of assignment in specific services so that the program will stress education through continuing rather than episodic medical experience. Such a unified two-year program will permit and encourage the necessary progression of responsibility.

Obstetrics and Gynecology.—The opportunity for training in obstetrics during the elective period should be a requisite of all programs. Participants who plan to practice obstetrics are expected to spend at least four months in obstetrical training. Physicians planning to undertake other than uncomplicated procedures should take additional advanced training in this field. For those who do not anticipate an obstetrical practice, the elective portion may be utilized for further training in other segments of the program. Experience should be provided in office-type gynecology (and the care of the newborn if not included in pediatrics). It is urged that the concept of unity be applied to the elective period to prevent unduly short assignments that would provide little educational justification.

Ambulatory and Outpatient Care.—Because the care of the ambulatory patient is an important part of medical practice, provision of adequate opportunities for the study of outpatients is essential and should be provided throughout the program insofar as practical in a manner that would permit following the patient over long periods of time.

Particularly with regard to the admission of ambulatory patients, it would be desirable if opportunity were provided in this program for their initial work-up before they are labelled as medical or surgical, in order that conditions ultimately treated surgically can be a part of the diagnostic experience of this program. This study of patients before identification of their illnesses as "medical" or "surgical" may begin in the outpatient department. It may continue in the hospital on the general medical service, but some hospitals may find it more convenient to establish admitting services for this purpose. Such training in diagnosis is essential if the conditions of a family practice are to be simulated.

Emergency Service and Surgery.—Throughout the two-year program, the participant should have experience provided by regularly assigned periods of emergency room service. The Committee believes that this should include training in minor surgery and the emergency and primary management of trauma. The emergency room service should also provide experience with the common medical and surgical emergencies and participation in their management. Participants in this program planning to undertake surgery other than minor surgery are expected to take additional advanced training.

Conclusions.—This report presents the minimal program under optimal circumstances for preparation for family practice in the future. The Committee believes that this two-year program would furnish a sound foundation for further graduate medical education and for continuing education in any field. The thoughtful cooperation of specialty groups will be essential to its success.

The Committee also recognizes that thoroughly sound implementation of the proposed program by medical staffs and governing boards of suitable hospitals will be required in order to realize fully its potentialities. The proposed program should receive the favorable attention of the best medical centers in this country. To achieve the ultimate objective of sound preparation in the future for family practice, this program should be initiated in suitable hospitals with the emphasis on quality.

Recommendations.—The Committee on Preparation for General Practice recommends to the Board of Trustees that (1) this report and specifically the basic program designed for preparation of family physicians be approved in principle and transmitted to the House of Delegates with a recommendation for its approval, (2) the Council on Medical Education and Hospitals be instructed to implement the intent of this report. Due attention should be given to the importance of initiating this new program on a modest scale so as to best assure that a high quality of educational experience will be a uniform characteristic of all such programs established. The Council on Medical Education and Hospitals should regularly and carefully review established programs so that Essentials of Graduate Training for Family Practice can be documented on the basis of sound experience.

With the submission of this report, the Committee has completed its assignment and requests that it be discharged.

Youth Fitness

The American Medical Association has had a long-standing interest in the fitness of youth, and, through its Department of Health Education and other departments and divisions, its Joint Committee with the National Education Association and many other cooperative relationships, has devoted considerable energy and effort to the improvement of youth fitness through a broad program of health education designed to emphasize intellectual, emotional, social, and moral and spiritual, as well as physical components of fitness.

The President of the United States has activated a Council on Youth Fitness among his Cabinet Members and has appointed a Citizens Advisory Committee on the Fitness of American Youth, composed of representative American leaders including several physicians, which are developing plans, suggesting projects, and recommending practices that are generally in keeping with the broad point of view on youth fitness held by the medical profession.

The views of the President's Council and the President's Citizens Advisory Committee on the Fitness of American Youth have been expressed as: to encourage the expansion of health education, to increase the status of physical education, to encourage continuing health supervision including periodic medical examinations and follow-up.

The Council and the Advisory Committee, in their deliberations, have emphasized the importance of developing youth fitness programs through existing agencies and organizations to prevent unnecessary duplication of services and facilities and cumbersome bureaucratic structures.

The Board of Trustees recommends that the American Medical Association, through the House of Delegates, approve in principle the aims and objectives of the President's Council and the President's Citizens Advisory Committee on the Fitness of American Youth and urge its member physicians to cooperate in the promotion of properly developed and soundly conceived plans and programs for youth fitness.

It also recommends that the constituent associations and their member local medical societies be requested, through their designated representatives, to work cooperatively with reputable professional and other ethical groups interested in the improvement of youth fitness.

Copies of this statement, if approved, should be transmitted to the President of the United States, to the members of the President's Council on Youth Fitness, and to the members of the President's Citizens Advisory Committee on the Fitness of American Youth.

Annual and Clinical Meetings

Following consideration of a report on housing and meeting room facilities of several cities, the Board of Trustees recommends to the House of Delegates that Chicago be selected as the site for the 1962 Annual Meeting and that the week of June 11-15 be chosen as the date.

The following places and dates have previously been approved for Annual and Clinical Meetings of the Association:

Annual Meetings:
  1960—Miami Beach, June 13-17
  1961—New York, June 26-30
Clinical Meetings:
  1959—Dallas, Texas, Dec. 1-4
  1960—Washington, D. C., Nov. 29-Dec. 2
  1961—Denver, Nov. 28-Dec. 1
  1962—Los Angeles, Nov. 26-30

ACCOUNTANTS' REPORT

The Board of Trustees,
American Medical Association:

We have examined the statement of assets, liabilities, and fund balance of American Medical Association as of December 31, 1958 and the related statement of income and fund balance for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

During the year ended December 31, 1958 certain adjustments were made to balance sheet accounts and resulted in a net charge to fund balance of $696,444. Except for $162,673 arising from revaluation of furniture and office equipment these charges resulted from changes in accounting methods. These changes, of which we approve, are more fully described in notes to financial statements and were adopted to provide more effective budgetary control over certain operations and to more fairly present the financial position and results of operations in conformity with the objectives of the Association.

In our opinion, with the foregoing explanation, the accompanying statements of assets, liabilities and fund balance and income and fund balance present fairly the financial position of American Medical Association at December 31, 1958 and results of its operations for the year then ended, in conformity with generally accepted accounting principles, which except for the changes in accounting methods referred to above, were applied on a basis consistent with that of the preceding year. Also, in our opinion, the accompanying schedule is stated fairly in all material respects when considered in conjunction with the financial statements taken as a whole.

Peat, Marwick, Mitchell & Co.

Exhibit A

STATEMENT OF ASSETS, LIABILITIES AND FUND BALANCE

Dec. 31, 1958,

with Comparative Figures for 1957

Assets	1958	1957
Cash	$ 179,417	$ 330,150
Accounts receivable:		
Advertising	656,737	500,744
Directory report service	9,371	20,526
Other	69,728	55,384
	$ 735,836	$ 588,654
Interest accrued on investments	$ 55,693	$ 75,927
Inventories of materials and supplies, at cost	362,199	392,715
Expenditures on publications in process (note 1)		102,947
Prepaid expenses, deposits, and advances:		
Deposits and advances	107,237	120,895
Commissions applicable to unexpired subscriptions to publications (note 1)		649,051
Insurance and other prepaid expenses	27,278	81,270
	$ 134,515	$ 851,216
Marketable securities and other investments, at cost (security values based on market quotations—1958, $10,871,267; 1957, $9,909,622—other investments based on cost) (note 2):		
United States Government securities	$ 7,863,056	$ 7,669,330
Industrial bonds	5,000	527,728
Common stocks	2,152,913	1,408,417
Other investments	320,172	46,785
	$10,341,141	$ 9,652,260
American Medical Association Research Fund:		
United States Government securities, at cost (value based on market quotations—1958, $1,422,666; 1957, $1,474,552)	$ 1,486,279	$ 1,479,669
Cash	14,296	9,981
	$ 1,500,575	$ 1,489,650
Property, plant, and equipment (note 3)	$ 3,538,597	$ 3,303,860
Less allowance for depreciation	1,175,513	1,432,428
	$ 2,363,084	$ 1,871,432
	$15,672,460	$15,363,951

Liabilities and Fund Balance	1958	1957
Accounts payable and accrued expenses:		
Accounts payable	$ 650,081	$ 584,615
Accrued payroll	36,955	32,576
Accrued taxes	91,172	83,103
Employees' withholding taxes	55,536	50,311
	$ 833,744	$ 750,605
Provision for completion costs of cumulative index volumes to be issued (less amount recoverable by subscription—1958, nil; 1957, $190,985) (note 6)		$ 169,296
Deferred credits:		
Unexpired subscriptions to publications	$ 1,918,056	1,626,654
In n directory report costs applicable to $382,958) (note 5)		420,224
O ved in advance	20,850	49,008
	$ 1,938,906	$ 2,095,886
American Medical Association Research Fund reserve	$ 1,489,650	$ 1,489,650
Other reserves:		
Association	350,000	350,000
Retirement	400,000	400,000
1 modernization	1,000,000	1,000,000
	200,000	200,000
	1,860,000	1,860,000
	$ 3,810,000	$ 3,810,000
	$ 7,600,160	$ 7,048,514
Fund balance (Exhibit B)	$15,672,460	$15,363,951

Exhibit B

STATEMENT OF INCOME AND FUND BALANCE

Year ended Dec. 31, 1958

Income:		
Membership dues and subscriptions to periodical publications		$ 4,701,378
Advertising		7,140,320
Income from investments		451,211
Income from 20th edition directory report service and copy sales, less costs applicable thereto (note 5)		649,751
Other income		33,146
		$12,975,806
Costs, expenses, and other charges:		
Printing and publication costs of periodicals, books, and pamphlets	$ 6,688,737	
Councils, bureaus, and related activities (Schedule 1)	4,509,170	
Other expenses (including annual and interim meetings, net—$95,913)	331,149	
Excess of charges over credits in connection with the closing of the printing department (note 4)	98,660	
Contribution to American Medical Educational Foundation	100,000	11,727,716
Income in excess of costs, expenses, and other charges		$ 1,248,090
Fund balance at beginning of year		$ 7,048,514
Income in excess of costs, expenses, and other charges for the year ended December 31, 1958 (as shown above)		1,248,090
		$ 8,296,604
Adjustments—credits (charges):		
Adjustment of furniture and equipment valuations to appraisal value at December 31, 1958 (note 3)	(162,673)	
Write-off of commissions applicable to unexpired subscriptions to Today's Health (note 1)	(717,708)	
Write-off of unearned subscriptions to the 21st edition of the Directory (note 6)	14,641	
Write-off of the provision for completion costs of cumulative index volumes to be issued (note 6)	169,296	(696,444)
Fund balance at end of year		$ 7,600,160

See accompanying notes to financial statements.

NOTES TO FINANCIAL STATEMENTS

Dec. 31, 1958

(1) Expenditures for publications in process and prepaid commissions to agents for magazine subscriptions were deferred as of Dec. 31, 1957, in the amounts of $102,947 and $649,051, respectively. In the year 1958, the Association adopted a change in method of accounting for such items with the result that prepaid publication costs and commissions to agents are not accrued at the close of the year. These changes in accounting methods were made to provide more effective budgetary control over expenditures and in recognition of the fact that in future years such expenses will be on a reasonably uniform basis when compared with related revenues. As of Dec. 31, 1958, commissions to agents on unexpired subscriptions in the amount of $717,708 were charged to fund balance. All publication costs were charged to operating expense in 1958.

(2) It is the practice of the Association to merge the investments of its restricted and unrestricted funds. The equities of funds in investments at Dec. 31, 1958 and 1957 are shown below:

	1958	1957
Unrestricted—general	$ 5,355,141	$ 4,407,260
Restricted:		
Depreciation reserve	1,176,000	1,435,000
Association reserve	350,000	350,000
Retirement reserve	400,000	400,000
Building improvement and modernization	1,000,000	1,000,000
Equipment modernization	200,000	200,000
Building replacement	1,860,000	1,860,000
	4,986,000	5,245,000
	$10,341,141	$ 9,652,260

(3) During the year 1958 detailed records of office furniture and equipment were established and coincident therewith cost or appraisal values of such property were determined by Horder's, Inc., of Chicago, Illinois and the Association. The item values so established resulted in a write down of $162,673 in office furniture and equipment.

(4) In 1956 the Association entered into contracts with printers for its periodicals, and began the closing of its printing department for such purposes. Under this program only a small service unit will be retained to accommodate needs of the administrative offices. The excess of charges over credits for the current year with respect to the closing of the printing department was $98,660.

(5) The 20th edition Directory was completed during the current year and all income and costs pertaining thereto, which had been deferred, were closed out in 1958 in conformity with the practice followed by the Association in prior years. Effective Jan. 1, 1959 the Association will no longer defer either income or expenses with respect to the directory.

(6) The net amount of $183,937, representing unexpired subscriptions to the 20th edition of the Directory and to the Quarterly Cumulative Index, less accumulated completion costs of the cumulative index was credited to fund balance at Dec. 31, 1958. This change in accounting procedure was adopted in recognition of continuous incurrence of costs on the index together with a continuous flow of subscription income throughout any given fiscal year.

(7) Because of the various changes in accounting treatment hereinbefore described, 1957 income and expense items are not wholly comparable to 1958 factors, and accordingly 1957 figures have been omitted from this report.

(8) The approximate future liability of the Association in connection with the rehabilitation of the building facility (general office headquarters) is $1,770,000 as of Dec. 31, 1958.

STATEMENT OF ASSETS, LIABILITIES AND FUND BALANCE
JAN. 1, 1959

Assets		
Cash		$ 179,417
Accounts receivable:		
Advertising	$ 656,737	
Directory report service	9,371	
Other	69,728	735,836
Interest accrued on investments		55,693
Inventories of materials and supplies, at cost		362,199
Prepaid expenses, deposits and advances:		
Deposits and advances	107,237	
Insurance and other prepaid expenses	27,278	134,515
Marketable securities and other investments, at cost (security values based on market quotations, $10,874,267—other investments based on cost):		
United States Government securities	7,863,056	
Industrial bonds	5,000	
Common stocks	2,152,913	
Other investments	320,172	10,341,141
American Medical Association Research Fund:		
United States Government securities, at cost (market value based on quotations—$1,422,666)	1,486,279	
Cash	14,296	1,500,575
Property, building and equipment	3,538,597	
Less allowance for depreciation	1,175,513	
		2,363,084
		$15,672,460
Liabilities, Reserves, and Fund Balance		
Accounts payable and accrued expenses:		
Accounts payable		$ 650,081
Accrued payroll		36,955
Accrued taxes		91,172
Employees' withholding taxes		55,536
		833,744
Deferred credits:		
Unexpired subscriptions to publications	$ 1,918,056	
Other, including dues received in advance	20,850	1,938,906
Net investment in property, building, and equipment		2,363,084
Reserves for:		
American Medical Association Research Fund	1,500,575	
Funding of depreciation of property, building, and equipment	1,175,513	
Liability on uncompleted contracts—rehabilitation of building	1,770,000	
		4,446,088
		6,090,638
Fund balance		$15,672,460

April 27, 1959

A. M. A. VIEWS ON S. 94

Honorable Olin D. Johnston, Chairman
Post Office and Civil Service Committee
United States Senate
Senate Office Building
Washington 25, D. C.

Dear Senator Johnston:

This letter, outlining the position and recommendations of the American Medical Association with respect to S. 94, 86th Congress, is respectfully submitted for the consideration of your committee. We are presenting our views in a written statement rather than through oral testimony because of the difficulty which we understand you have encountered in hearing all who have applied to testify. If, however, any member of the committee has specific questions which he would like to direct to the American Medical Association, be assured that we will do our best to supply an answer.

For many years the American Medical Association has been active in encouraging the extension of coverage and the improvement of benefits under Blue Cross, Blue Shield, and commercial health insurance programs. Our interest in the over-all field has included serious consideration of a health insurance program for the benefit of federal employees and their dependents. For at least the last five years we have followed closely the bills that have been introduced in Congress in this regard and have worked with the U. S. Civil Service Commission and other interested agencies inside and outside of government in an effort to devise the most satisfactory arrangement.

At its meeting on March 19-20, 1955, our Board of Trustees voted to approve legislation which would authorize the Civil Service Commission to make available, on a voluntary contributory basis, group hospital, surgical, medical, and other personal health benefits for civilian officers and employees in the federal service. This is still the official position of the Association.

As a result of a more detailed consideration of pending legislation by our Council on Medical Service and our Council on Legislative Activities, it has been suggested that the plan finally agreed upon should (a) permit a realistic choice of plan on the part of the individual employee; (b) permit all qualified carriers to offer coverage; (c) require financial participation by the employee in the payment of premiums under any plan or plans selected; (d) provide for a minimum of governmental regulatory authority over participating carriers or plans; and (e) provide for adequate pre-funding for persons who retire after July 1, 1959, and a method by which the person who retired before that date can participate on a contributory basis.

It is our further belief, however, that the American Medical Association should not attempt to offer suggestions as to (a) the specific amount of the government contribution to the program; (b) the maximum benefits payable under the basic or major medical program; or (c) the formula to be applied in determining the eligibility of an insurer to participate in underwriting basic or major medical benefits.

In applying these policy statements to S. 94, the pending bill, it is our belief that satisfactory amendments could be made rather easily within the framework of this legislation. Without suggesting specific amendatory language we would recommend that further consideration be given to the following provisions of the bill:

Sections 5 and 6.—These sections describe the basic health plans and the major medical benefits covered by the bill.

Although section 5 specifies that the individual employee must elect to participate under one of the four basic health plans, it is not clear whether major medical insurance coverage under section 6 would be automatic for all employees or for those who elected to participate under section 5. This should be clarified.

In our opinion a more important provision of section 6 deals with the vesting of authority in the Civil Service Commission to select "one or more insuring companies" to provide group major medical coverage. This provision, plus the assumption by the government of the entire cost of this coverage, are in our opinion the most objectionable features of the bill.

Briefly, it is our position that there should be no distinction between sections 5 and 6 insofar as free choice of carrier and employee participation in the payment of premiums is concerned. We would favor a combined basic and major medical program with an opportunity for the employee to exercise a choice in the selection of the plan and a requirement that he pay a part of the premium. This, in our opinion, would result in improved health service under a more acceptable and more easily administered program. It would also eliminate any discrimination in favor of only one or two insurers providing major medical coverage.

It is recognized that all plans providing basic benefits do not offer the supplemental or major medical coverage. In these instances the government could contract with other carriers to provide the additional major medical coverage for those persons selecting basic plans which do not in themselves provide it.

It is also possible that section 6 in referring to "insurance companies" may rule out Blue Cross and Blue Shield Plans from underwriting major medical coverage. The language should be amended.

The provisions of section 6 (c) establishing a variable deductible based on annual salary is, in our opinion, a desirable feature of the bill and should be retained. It is noted that the section is silent as to how the deductible feature will be applied for retired employees and survivors. It would seem, also, that some provision should be included in this section to delineate the maximum major medical benefits payable.

In section 5 (b) reference is made to "basic health benefits" in connection with cash indemnity plans. Since this terminology is omitted in describing the plans under section 5 (a), (c) and (d), it is not clear whether a distinction is intended. In our opinion the same or similar descriptive language in all four subsections would be preferable.

Section 10.—This section deals with the division of premium costs between the government and the employee with respect to the basic plans covered by section 5. As stated above it is our belief that the employee should also share in the cost of the major medical coverage authorized under section 6.

Section 11.—As stated earlier we believe that the program should include persons already retired and those retiring after July 1, 1959, on a contributory basis. It is probable that if this type of provision is included in the bill this section would have to be amended to provide more specifically for pre-funding and for a method of financing the benefits payable to persons who retired prior to July 1, 1959.

Sections 12 and 16.—These sections provide the commission with certain regulatory authority. It is not clear, however, whether the establishment of a medical fee schedule is intended. It is our definite recommendation that fee schedules not be established by the commission. We suggest instead that consideration be given to incorporating either in the law or administrative regulations, authorization under the major medical program for payment of a stipulated percentage of the "usual and customary" charges, which language is contained in the majority of polices providing this type of coverage.

Section 13.—It is not completely clear whether this section is intended to apply retroactivity to employees who retired before July 1, 1959. Although we recognize that such authorization would represent somewhat of a deviation from past precedents we believe that participation by these individuals on a voluntary and a contributory basis is desirable.

It is recognized that inflationary trends have made it difficult for some of these individuals to purchase medical care and hospitalization, as well as other of the basic necessities of life. Their inclusion in this legislation would provide them with a contributory mechanism for the procurement of health benefits.

In conclusion and on behalf of the American Medical Association, I would like to express our appreciation for the opportunity to present our views on S. 94, 86th Congress. If the Committee is desirous of additional comment or information, please feel free to call on us.

Sincerely yours,
/s/ F. J. L. Blasingame, M.D.
Executive Vice-president

STATEMENT TO HOUSE OF REPRESENTATIVES ON H. R. 5944

April 29, 1959

The Honorable Brent Spence
House of Representatives
Washington 25, D. C.

Dear Congressman Spence:

The American Medical Association was requested to comment on H. R. 5944, the "Community Facilities Act" introduced by you.

As you know, this bill is concerned with the improvement and construction of community health facilities, especially water purification and sewage treatment and disposal plants, hospitals, and nursing homes. It proposes establishment of new federal lending authority to assist local communities to finance such facilities.

The American Medical Association has taken no official action on this bill and therefore this statement is based on past actions and established policy. In line with our continuing effort to bring about better health to the nation, we agree that an effort to improve, expand, and establish needed health facilities is commendable.

The American Medical Association recognizes that community programs to protect the public health depend to an important degree on the availability of pure, uncontaminated water, and on the disposal of human and industrial waste products. Although most large cities and towns probably now conduct sanitation programs embodying these two essential services, there remain a significant number that need new or improved plants and facilities.

Hospitals and nursing homes likewise constitute essential elements in a community health program. The A. M. A. has demonstrated its continuing interest in both types of facility by supporting, since its inception, the Hill-Burton Act, and by endorsing that portion of the housing bill that provides for government guaranteed mortgage loans for proprietary nursing homes. The financing problems of the nation's hospitals in terms of construction, renovation, and repair are a continuing challenge. The A. M. A. strongly supports a rapid expansion of nursing homes, both proprietary and nonprofit.

The A. M. A. recognizes the hospitals' need for funds to finance plant and equipment for the training of many paramedical groups, especially nurses, and the housing of interns and residents.

Traditionally the A. M. A. has urged local financing of local programs. The A. M. A. is aware that some communities refuse to support a level of public expenditures sufficient to meet minimum needs.

When situations have arisen that seemed to demand federal financial participation, we have supported grant-in-aid programs administered by the Public Health Service or government guaranteed loans of the FHA type.

Yours sincerely,
F. J. L. Blasingame, M.D.
Executive Vice-president

TELECASTS FROM ATLANTIC CITY

Television viewers in New York City, Washington, D. C., and Boston will see special programs from the American Medical Association's Annual Meeting next week. The half-hour telecasts will be part of the A. M. A.'s Bulletin of the Air series which will originate live over Philadelphia's WFIL-TV at 5:30 p. m. Monday through Thursday. Videotape recordings of the Bulletin of the Air will be seen in New York Wednesday and Thursday, June 10 and 11, at 10 p. m. over WOR-TV; in Washington, D. C., Thursday and Friday, June 11 and 12, at 11 p. m. over WTTG-TV, and in Boston Thursday and Friday, June 11 and 12, at 7:30 p. m. over WBZ-TV. The programs are presented by Merck Sharp & Dohme in cooperation with the American Medical Association.

NEW A. M. A. PUBLICATIONS

A New A. M. A. leaflet entitled "As Others See Us," published by the Joint Committee on Health Problems in Education of the National Education Association, was written primarily for teen-agers. This illustrated, easy-to-read leaflet will prove valuable to doctors, educators, ministers, parents, and youth counselors for the insight it provides into the problems of adolescence. The cost of a single copy is 25 cents; quantity discounts are available.

"Old King Cold" is a shirtpocket-sized pamphlet containing suggestions that can help employees avoid the common cold, hasten recovery, and prevent complications. The cost of a single copy is 15 cents; quantity discounts are available.

These publications may be purchased from the Order Department, American Medical Association, 535 N. Dearborn St., Chicago 10.

PAMPHLET ON SCHOOL HEALTH SERVICES

A revised edition of the pamphlet "Responsibilities of State Departments of Education and Health for School Health Services" published by the Council of Chief State School Officers and the Association of State and Territorial Health Officers has just been made available. This brochure first published in 1951 has been a very useful document for physicians serving the schools, school administrators, and public health officials.

The new edition, prepared with the aid of consultants representing both medicine and education, brings up to date the recommendations of the earlier edition. The brochure is available at 35 cents per copy from the Council of Chief State School Officers, 1201 16th St. N. W., Washington 6, D. C.

YOUR MAIL ADVERTISING ADDRESS

When you change your address in your official medical records at the A. M. A., the same address change will be reported to the advertising list users who send you direct mail advertising material. If you would like to change the address at which you are receiving advertising promotion material, please notify the A. M. A. immediately.

COUNCIL ON MEDICAL SERVICE

HEALTH INSURANCE FOR THE AGED

J. F. Follmann Jr., B.S., New York

Today seven principal methods are being used by insurance companies to provide protection for the aged against the costs of medical care.[1] These methods have largely come into being in the past few years. These methods are (1) continuation of insurance on older active workers under group insurance plans; (2) continuation of group insurance on workers who retire and their dependents, generally with part or all of the premium paid by the employer; (3) continuation on an individual policy basis of coverage originally provided by group insurance, this being accomplished by conversion of the group coverage on termination of employment or membership in the insured group; (4) new issuance of group insurance on such groups of older people as associations of retired persons or employees, retired teachers and civil servants, and golden age clubs; (5) continuation into the later years of individual insurance purchased at the younger ages, including lifetime guaranteed renewable coverage; (6) new issuance of individual insurance at advanced ages; and (7) issuance of insurance that becomes paid up at age 65, thus enabling the policyholder to pay for his protection during his productive years.

Other types of health insurers use certain of these approaches and are making valuable contributions to the extension of health insurance protection to aged people. Several recent studies bear witness to both the relative recentness as well as the effectiveness of these developments.

A survey conducted by the Health Insurance Association of America, in 1957,[2] indicated that among 160 group insurance plans underwritten by eight insurance companies, which write about two-thirds of all group health insurance in the United States, 48% of the plans provided for continuation of coverage after retirement for both employees and their dependents in 1956. In 1952, only 24% of these 160 plans had the continuation of coverage provision in the policy. Thus, in four years the proportion of these group cases providing for continuation of coverage at retirement had doubled.

In New York State, between 1951 and 1956, according to a statement by the superintendent of insurance, the number of master policies providing such coverage in retirement had increased fourfold.[3] A survey conducted by the New York State Insurance Department, in 1957,[4] among all insurance companies licensed to do business in that state, showed that 63% of all group plans providing for continuation of coverage after retirement had the provision included in the policy during or subsequent to 1954. A more recent survey of 92 group insurance plans conducted by the United States Bureau of Labor Statistics in early 1958[5] indicates that 68% of the plans in early 1958 provided benefits for retired workers as compared with 54% in late 1954. In all but three of these plans, the study further indicates, the employer pays all or a large portion of the premium.

This recent trend toward providing continuation of coverage at retirement through the group mechanism will not only have a marked affect on persons reaching retirement age in the future but will also make its presence known on a more immediate basis. An informal survey of five of the leading group insurance writers reveals that about half of the employers who are currently installing retirement benefits on presently active workers also provide the coverage to former employees already retired. A relatively few years ago, most hospital expense insurance policies sold to individuals terminated at age 65. Currently, at least 29 large insurance companies offer policies which are guaranteed renewable for lifetime, and this number should multiply significantly in the near future.

Number of Aged Covered

The most recent nationwide over-all estimate of the number of persons in the United States 65 years of age and older having some form of voluntary health insurance coverage was made in March, 1957, by the National Opinion Research Center—the estimate being 39% of all noninstitutionalized persons aged 65 and over.[6] It should be noted, however, that the United States Department of Health, Education, and Welfare estimates that 43% of Old-Age and Survivors Insurance (OASI) beneficiaries had some form of voluntary health insurance in the fall of 1957.[7] This study further showed that while, on the average, 43% of all OASI beneficiaries had some form of health insurance, the percentage was highest in the 65-to-69-year age group (49.5%). It was also generally higher among female beneficiaries (45.1% for all aged 65 and over), and among those beneficiaries, in turn, it was higher for single females (49.8% for all aged

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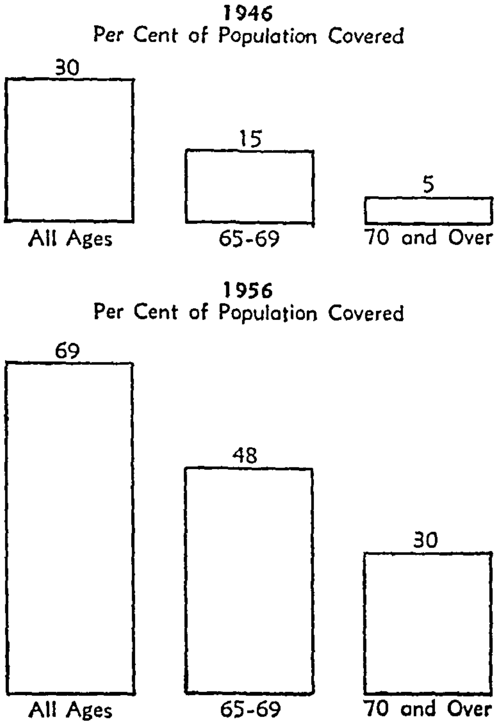
Director, Information and Research Division, Health Insurance Association of America.

65 and over). It is noteworthy that of all OASI single female beneficiaries aged 65 to 69, 57.9% were protected by some form of voluntary health insurance; 31.7% of single female beneficiaries aged 80 and over had some form of voluntary health insurance.

However, any estimate of the number of covered aged in relation to either the total number of noninstitutionalized persons aged 65 or over in the population or to the total number of OASI beneficiaries produces an inaccurate conclusion with respect to the role being played by voluntary health insurance, since it employs a noncomparable, and hence invalid, denominator. This is so because there is a sizable percentage of the aged in either of these groupings who do not need or want, or who might consider that they do not need, health insurance protection. Their total has never been estimated with any precision. However, it is known that 18% of the aged are public welfare recipients under the federally aided public assistance programs and, as such, eligible to receive health care.[8]



Comparison of number of persons with hospital expense protection through voluntary health insurance in 1946 and 1956. Source of data is *Extent of Voluntary Health Insurance in the United States, Research and Statistics Note no. 13,* Division of Program Research, Social Security Administration Health Administration Council.

In addition, there is the unknown number of aged who, for various other reasons, do not need, want, or believe in (for religious or other reasons) health insurance coverage. These include those who receive care from the Veterans Administration, the Medicare program, the Indian Health program, or local public or private agencies; those who receive care as being totally and permanently disabled, or as being members of the armed forces, seamen, members of religious orders, or as professional courtesy; and those who have sufficient income, accumulated assets, or family resources to feel no need for insurance protection.

That these factors are real considerations in the minds of people is borne out in a 1957 public opinion study in Michigan[9] which revealed that 15% of the people not covered by a prepayment mechanism "don't think we need it." Another 17.6% "haven't got around to taking it out"; 13.9% "never gave it a thought"; and 3.2% "don't know." Still another 7% said they "don't believe in insurance"; 2.1% "get free treatment"; and 2.1% are "covered by veterans' benefits." Hence, of the people in Michigan not covered, 60.9% appear either to feel they do not need insurance or do not choose to purchase it. More pertinently, these factors are borne out by a Health Information Foundation study in 1957[6] which shows that less than 3% of aged persons interviewed had tried to buy health insurance and been turned down. More than one-fourth of the uninsured aged had never thought of getting such insurance, while twice as many said they didn't want it.

Since 2,700,000 of the aged are public welfare recipients, it would seem a conservative estimate that, of the 15 million persons aged 65 and over, 3 to 5 million do not need or want voluntary health insurance protection. Hence, with a mean of 4 million, a more proper denominator in any evaluation of the present extent of voluntary health insurance would be 11 million persons instead of 15 million. With this denominator, the adjusted estimate of the percentage of aged persons who need and want some health insurance protection, and who presently have such protection, would therefore be at least 51% as of March, 1957. As has been shown, the percentage for OASI beneficiaries would be higher.

Factors Affecting Growth of Coverage

In any consideration of the present degree of coverage of the aged, it is important to recognize that delayed reaction in the recent growth of coverage among the population under age 65 and not yet retired is inherent and that, therefore, the percentage of the aged covered in the future can safely be expected to increase. The voluntary health insurance movement is a development largely of the post–World War II period. At the beginning of 1947, for example, 30% of the population are estimated to have had some voluntary health insurance protection. A decade later this proportion had more than doubled to an estimated 70%.[10]

Today, 74% of the population under age 65 have some voluntary health insurance coverage. It would appear self-evident that the growth of coverage among persons under age 65 would bear some direct relationship to the number of the aged who will eventually be covered as those now under age 65 move into retirement. This is recognized in a recent study[7] of OASI beneficiaries made by the U. S. Department of Health, Education, and Welfare when, commenting on the generally higher rate of health insurance coverage among females, the study states that females were on the average younger than male beneficiaries and "as a result, relatively more were closer to the age when health insurance could have been attained."

This hypothesis, furthermore, is graphically demonstrated by a chart (see figure) based on a comparison of 1946 and 1956 data. From this chart it can readily be noted that the percentage of all the persons over age 70 having some form of voluntary health insurance in 1956 was exactly the same as the percentage of the entire population at all ages which was covered in 1946.

Some Recent Developments

That insurance companies have been aware of the necessity for further accelerating these developments and for moving with resolve has been exemplified by a development of marked importance during the past year. In December, 1957, the board of directors of the Health Insurance Association of America, representing 265 insurance companies writing health insurance, appointed a special committee to give thorough consideration to the entire subject of the continuation of coverage. That committee, after eight months of study, made its recommendations to the board of directors on Oct. 28, 1958. On Dec. 8, 1958, at a special meeting of the association, these recommendations were approved by the association with only one dissenting note.

The recommendations are the following: 1. Insurers should minimize refusal to renew health insurance contracts solely because of deterioration of health after issuance. 2. Insurers should promptly make available to insurable adults policies which are guaranteed renewable for life. 3. Insurers should encourage the sale of permanent health care insurance where the need exists. 4. Insurers not now doing so should promptly offer individual and family hospital, surgical, and medical care coverages to persons now over age 65. 5. It is essential that adequate voluntary health insurance be available to broad classes of physically impaired people. 6. Insurers should develop and aggressively promote soundly financed group basis coverages that will continue after retirement. 7. Insurers should encourage the inclusion in group contracts the right to convert to an individual contract on termination of employment.

An important factor which will affect the coverage of the aged in future years is the increasing public awareness of the value of voluntary health insurance protection. Today the mechanism, the facility, by which the future aged might have health insurance protection is available. This is a fact too often overlooked.

However, insurance on a voluntary basis must be purchased as a matter of free choice by individuals on their own behalf or by employers, unions, or other types of organizations. The data to which previous reference has been made indicates that this is being done to an increasing degree. Nonetheless the degree of rapidity by which this will come about is directly affected by the degree to which individuals, labor unions, or employers make their choices in relation to the available dollars and their other economic wants.

From the standpoint of the individual who is not protected as a member of a group, choice must be made between health insurance and the many appealing, often highly advertised and installment purchased, consumer goods and services. With respect to the employer, health insurance has to compete not only with all the costs of production, including wages, but with other types of fringe benefits desired or demanded by employees. Employers in America have accepted their responsibility to their employees on an increasingly generous scale, to the extent where, today, fringe benefits average some 20% of payroll.[11] The employer is also faced with the problem of the extent to which his productive employees are willing to share in the provision of benefits to the retired employees. Since he has to compete with other employers in an open labor market for his employees, this becomes an important factor. In making his choice the employer, in turn, is often governed by the contracts arrived at through collective bargaining.

Potential Rate of Increase of Voluntary Health Insurance of the Aged

End of Year	Growth in % Covered	% Covered Who Need and Want Protection
1958	4.0	55
1959	4.5	60
1960	5.0	65
1965	15.0	80
1970	>10.0	>90

Therefore, as individuals, labor unions, and employers become increasingly cognizant of the importance of health insurance protection in the later years, and since the voluntary mechanism by which this protection might be provided now exists, it is reasonable to expect that the coverage of persons over age 65 in future years will increase more rapidly than has been so in the past.

Forecast for the Future

Since the number of aged owning voluntary health insurance has increased an average of 3% each year between 1952 and 1957, the following increases in this coverage, even without further development or progress, might be expected—51% in 1957, 54% in 1958, 57% in 1959, 60% in 1960, 63% in 1961, 75% in 1965, 90% in 1970, and over 90% in 1975. For OASI beneficiaries the figures would be larger, since they commence with a greater percentage covered and since the rate of growth among these persons has been greater (3½%).[7]

However, when reasonable allowance is made for the delayed reaction inherent in the recent growth of coverage of the population under age 65, for the increasing public awareness of the value of voluntary health insurance protection, and for the very recent developments being brought about by all types of insurers and plans in an endeavor to make voluntary health insurance available to all present and future retired persons who need and want such protection, it would follow that the potential rate of increase would exceed this base line and that the excess itself would increase for several years. Therefore, a conservative estimate of the potential of voluntary health insurance in assisting persons 65 years of age and older to meet the costs of hospital and medical care should, all other things being equal, approximate that shown in the table.

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HEALTH-WELFARE PARTNERSHIP

David E. Price, Washington, D. C.

For the health professions, homemaker services offer a quick lift in an overburdened time. We, in public health, are concerned with the general well-being of people, the healthy tone of family life, as well as the specific physical health of individuals; and so we are particularly involved in the needs of the chronically ill. Their long-term illnesses trap whole families, affecting the well in addition to the sick, threatening established ways of life, draining finances, wearing out affection.

The Homemaker

We are keenly interested in homemaker services because we know that the homemaker can do much to mitigate these effects. The physician is trained to serve the sick individual, but a homemaker is trained to serve the entire family. She cannot replace a physician—but by the same token, a physician cannot replace her. For many families, she brings new hope.

The mutual interest of the health and welfare professions in extending homemaker services affords a good illustration of how closely health change and social change bind us in inextricable partnership. The longer life span—a health gain—has given us an older population with consequent increase in chronic ills. These long-term disabilities in turn bring economic and emotional problems which can lead to more physical illness. Smaller families, working wives, and the change to an urban, apartment civilization—a social change—often give us no one to care for the bedridden and homebound. And so it goes, round and round—health-welfare, welfare-health. In the middle stands the homemaker, a personification of our partnership.

Chief, Bureau of State Services; Assistant Surgeon General, Public Health Service; United States Department of Health, Education, and Welfare.

Read before the National Conference on Homemaker Services, Edgewater Beach Hotel, Chicago, Feb. 10, 1959.

The aid she can give—in the freeing of nurses for more urgent professional concerns and the release of hospital and nursing home beds and facilities —is of practical value and great importance.

But, over and above this, it is the freeing of a patient's mind from fears of forced absence from family or confinement in an institution and the assistance given to families in bearing burdens of care beyond their strength which are of greatest national therapeutic good.

Although there are not enough homemakers today, there is no shortage in the reserve from which they can be drawn. There are thousands of mature women—warm, stable, intelligent—who can be recruited and trained; who will be eager to be trained; and for whom such employment will also be an answer.

Nor is there any long-term training period necessary. The preparation should be thorough, but it is not the year after year, costly education needed for doctor or nurse. Homemakers already know how to "make a home" from having made their own, how to tend children from tending theirs, how to be thoughtful and friendly, because they themselves have been lonely on occasion.

Agency training courses for homemakers vary widely in length, scope, and adequacy. In general, they seek to teach any special skills the homemaker may need. We hope that increasingly such training will include simple bedside home care, nutrition, infant care, and assistance in rehabilitation procedures. To encourage this trend, the Public Health Service has prepared a fact sheet dealing with specialized problems in home care of the chronically ill, which may have guide-line value for agencies developing homemaker training programs. In addition, with assistance from the American Medical Association and other groups, we have prepared a booklet, "Strike Back at Stroke." It is designed for doctors to use in training homemakers and other lay persons who can assist patients in the exercises necessary for rehabilitation after stroke.

Homemaker Services

State-Sponsored Services.—The need for health emphasis in homemaker training is highlighted in a study [1] made by the Public Health Service in preparation for this conference. This study reveals that 93% of the families receiving homemaker services during the study week in 1958 either had a sick member or members of the family in the home or needed a homemaker because of the absence of a member of the family who was hospitalized.

A number of state health departments are showing courage and enterprise in devising new programs. New Jersey has made a notable record in just this sort of pioneering with its community homemaker services. We in the Public Health Service wish more would do the same sort of thing.

In the fall of 1950, a homemaker service specifically designed to meet the needs of long-term patients was started in Essex County, New Jersey. It stimulated great interest throughout the state, and in 1952 when the Prevention of Chronic Illness Act became law in New Jersey, it contained a provision requiring the state department of health to "plan for . . . adequate visiting nurse and housekeeping aid services by appropriate public or private agencies throughout the State to the end that the nursing and medical care being furnished the chronic sick in their own homes shall be improved in every manner possible."

A State Consultant Committee on Community Homemaker Service was established to carry out this requirement through a cooperative program with community groups and the department of health. The Medical Society of New Jersey and its county societies gave endorsement and support.

Now, five years later, there are 11 autonomous voluntary community homemaker services in New Jersey—three of them established during the year just passed. They make community homemaker service available to one-half of the state, geographically, and serve more than half the population. Activities of planning committees in the state foreshadow the establishment of several more services this year.

The state health department carries all training costs through financial assistance to the extension division of Rutgers, the state university. Five hundred seventy-five homemakers have been trained—a figure equaling one-third of the national total of all homemakers reported in voluntary and public homemaker programs last year.

In the report [2] of this statewide program, there are words of real import,[3] unusual in an official document—"joy," "delight," "satisfaction," and "thrilling"—words which illumine the enthusiasm, enterprise, and teamwork that have made the New Jersey program not only possible but outstandingly successful. The part being played in the National Conference on Homemaker Services by the American Medical Association gives promise that other state medical societies may follow the New Jersey example.

Voluntary Services.—Representatives of national health organizations, co-sponsoring this conference have worked hard—in preconference study groups and planning committees—to make this a truly forward-looking, stimulating call for action. They are not all agreed on definition of terms, procedures, potentials, or guidelines. And that is fine, because too early and easy an agreement can deaden initiative and imagination. They are all agreed, however, that there must be definitions, procedures, and guidelines—though not necessarily any single method or procedure. The homemaker program is one that has developed in a variety of ways. And that is good, because it is a program of, and for, human beings whose greatest claim to humanity is divergence. The homemaker program can continue to develop in various ways and under various auspices.

Each of the national voluntary agencies has contributed much to the present development of homemaker services. Some have helped by providing training, some by organizing new services, and some by financing community programs. For example, the National Foundation has, of course, long maintained a home attendant program for thousands of poliomyelitis patients—differing in many ways from the usual homemaker services organized on a community basis, but rich in experience. It also purchases homemaker service from a number of programs.

The American Heart Association carries on an extensive national program of training in work simplification for homebound cardiac patients. Its local chapters participate in homemaker programs in many ways. In St. Mary's County, Md., for example, the association has given financial assistance to expand services, paying housekeeping aides in homes for patients with cardiac disease when there are no other available funds. In Chicago the local association gave funds to the Cook County Hospital for a home case demonstration program, including homemaker services.

In at least 21 of the American Cancer Society's 60 divisions, there is already some type of activity involving homemaker service—usually referred to as housekeeping assistance. They train and supervise housekeeping volunteers of their own and also contribute to the financial support of other agencies for their homemaking programs.

The National Tuberculosis Association is deeply interested in homemaker services, since a majority of tuberculous patients within the 25-to-45-year range are women—many of them responsible for families. The association is aware—as we are in the Public Health Service—that at the present time many existing homemaker programs utilize criteria which are restrictive in meeting the needs of long-term patients. It hopes to be able to promote greater understanding of the importance of developing long-term services. Several homemaker programs receive substantial grants for the care of tuberculous patients from the NTA.

The National Health Council has told us that it is looking forward to a new health career category coming out of this conference, and so it urges upon us the necessity of developing a clear definition of homemaker services and programs. Here you see an invaluable marshaling of interest and aid, a vast reservoir of assistance. There is need for truly ingrained teamwork at this national level in order to pave the way for cooperation at all levels. Of course, most important of all is the local level.

Community-Sponsored Services.—In a cooperative venture in New York City, homemaker services were developed as a natural extension of hospital services.[4] This is the work of the Jewish Family Service which serves Manhattan, the Bronx, and Brooklyn. It provides homemaker services to its own clients on the usual family casework plan, but in addition it makes homemakers available to three hospitals—Beth Israel, Hillside, and Mount Sinai; to the Altro Health and Rehabilitation Service; and to the home-care project of the Central Bureau for the Jewish Aged. It employs, trains, and pays these homemakers and then turns them over to the hospitals' medical-social workers to supervise in a medically focused program.

Often homemaker service plays an essential part in carrying out the goals of comprehensive medical treatment and care for the family until the patient reaches normal or optimum functioning. But if a family has to apply to one agency for homemaker services, in order to carry out another agency's medical care treatment, a bottleneck in the provision of services can result.

Realization of the waste involved for patient, family, caseworker, and administrative staff in this duplication led to the establishment of the present integrated program in New York. It has been achieved with no increase in cost and provides more satisfactory service. Hospitals in other communities might well consider the feasibility of similar arrangements, particularly in connection with their home-care programs.

In Detroit; Omaha; Syracuse, N. Y.; and New Canaan, Conn., visiting nurse associations provide another type of medically supervised homekeeping. Faced with inadequate community resources, the Visiting Nurse Association in Detroit, for example, established its own homemaker service in 1955, employing 30 home aides.[5] It has a daily census of 1,000 patients with chronic or long-term conditions from whom to select candidates for home aide service. Obviously it needs more aides. A count taken on a single day last year showed 325 patients between the ages of 75 and 95. Only eight had received home aide service that day.

The strength of the program is the teamwork of the family, the professional nurse, the home aide, and the fact that the resources of the agency are available to the aides. Three years' experience have convinced the professional staff that this service has increased the usefulness of the visiting nurse and is a vital part of any home-care program.

Conclusions

These then are some of the hopeful ways homemaker services have been developing in health-related settings. I wish there were more of them. I hope there soon will be. They are not, of course, a panacea, but I can really see no end in sight to the needs for homemaker services or the gratitude they can earn from families and the health and welfare professions.

But there are so few homemakers. In 1957, 14,000 families were served by them—only 14,000 out of the estimated 43 million families in the United States.[6] Today, 153 agencies report homemaker service programs, but how many homemakers does this mean? Some programs have only one or two! Last year, there were only some 1,800 listed in the whole country. Report after report coming in to us in preconference material read, "We can serve only one-third of our applicants," "We are not meeting the real needs of the community," "We have to turn down 60% of our applicants."

Why? With everyone in favor? Because no one is opposed, do we sit back and think these services will come into being simply, easily, of their own accord? They won't. It takes at least a year of planning, negotiating, and arranging to establish a new homemaker service—and this after preliminary years of basic preparation.

We, in health and social fields, see the people who need these services as individuals, and we know how great is their need. We would not sign the commitment papers that separate an old couple, because we know it could easily be a death warrant. We would not be responsible for taking the child away from the widower father, because we see not only the end of a family but the intensification of tragedy for the child. We are automatically in favor of homemaker service that can prevent separation, because we know.

But for too many other people these things happen out of sight and without their knowledge. It is not enough for us to see them, we must make others see also, not in statistics or as caseloads or diagnoses, but in human terms. We must make people see the need and see the hope.

Let us stop thinking it will be easy, and let us work hard. Let us stop congratulating ourselves that it will be a cinch to recruit homemakers; let us start recruiting them. As Kingsley says, "Let us do lovely things all day long—not dream them." For the gifts of hope and dignity and surcease are lovely things indeed—things with glory about them.

We must be flexible. We must be inventive. We must be realistic. It will cost money; and yet we can point out that costs of homemaker services would have to go for other, less satisfactory services, if the homemakers did not exist. For example, Colorado reports 69 children cared for in their own homes by 13 homemakers during one month at a cost of $1,400.[7] Had they been placed in foster homes, the minimum boarding cost would have amounted to $4,100. Moreover, establishment of homemaker services requires no financial outlay for buildings, grounds, and maintenance.

A vital question to be considered at this conference concerns the financial status of the family served. Even the well-to-do may not know where to go or, indeed, have anywhere to go to find the kind of help needed in a family emergency. There is a great deal of difference between trying to hire a maid, hoping desperately that she will stay in spite of difficulties and health emergency in the family, and in welcoming a trained person coming into the home because of these very difficulties and disruptions. The homemaker is guaranteed in advance, backed by a reliable community agency of fine reputation, with casework and counseling available if needed. Homemaker service therefore should not be restricted to any economic group. Of course, if the family can pay for the service, it should.

To be of use to us in the health field, particularly with the handicapped and chronically ill, there should be no restrictive time limit placed on length of continuing service. It is long-term care that can offer so much in health gain and restoration of self-sufficiency to a patient suffering from the handicapping results of stroke, heart disease, tuberculosis, poliomyelitis, severe diabetes, or accident. If the long hours between visits of doctors, nurses, and physical therapists are wasted, the patient wastes also, in a sort of twilight, vegetative existence.

But if there can be someone present to prompt and encourage during part of these hours, the time becomes a time of practice and achievement which can return the patient truly to life. This kind of priceless companionship is being given by homemakers today and could be given in many more homes.

As chief of a bureau which works directly with the states, I have noted a growing trend in health departments toward a research approach to public health practice. We are encouraging this in every way possible. At the state and local level they are seeking fresh ways of meeting health needs, trying to fit methods to people rather than forcing people into rigid patterns of established procedure. In such a search, homemaker services should prove of interest to many.

The surgeon general has asked me to express his deep personal interest and to assure you that the Public Health Service will give all possible assistance to the advancement of homemaker programs.

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MEDICAL NEWS

CALIFORNIA

Dr. Lederberg Gives Nobel Lecture.—Joshua Lederberg, Ph.D., head, department of genetics, Stanford University School of Medicine, co-winner of the 1958 Nobel Prize for Medicine, delivered his Nobel Prize Lecture in Stockholm May 29 on "Genetic Recombination." Dr. Lederberg will give other lectures in Scandinavia and elsewhere while abroad, and will visit former colleagues in laboratories at Copenhagen, Milan, Paris, and London.

Dr. Kaplan Named Cancer Award Recipient.—Dr. Henry S. Kaplan was named the recipient of the second annual award "for meritorious investigation by a scientist under the age of 45, in the field of cancer," awarded by the Ann Langer Cancer Research Foundation of Chicago. Over $115,000 has been contributed by the foundation to the University of Chicago, Michael Reese Hospital, and Mount Sinai Hospital in Chicago and Hebrew University in Israel for cancer research work. The award is supported by the family of the late Bertha Goldblatt Teplitz for whom the award is named. Dr. Kaplan, professor of radiology, Stanford University Medical School, received the award "for his significant contributions to the field of both basic and clinical cancer research." He has been the director, Biophysics Laboratory, Stanford University, since 1958.

Campaign Against Accidental Poisoning.—Members of the Alameda-Contra Costa Medical Association Child Welfare Committee have started a campaign aimed at reducing the number of child poisoning cases in the San Leandro-Hayward area. The association is distributing 50,000 notices to parents of school children which point out that in the South County area there are 35 child-poison cases per 10,000 residents as compared with 16 per 10,000 in the remaining Alameda-Contra Costa communities. The two-year child-injury survey (1957-1958) of the association has indicated that each week 54 children are taken to East Bay hospitals because they swallowed a poison product. The survey showed that the 2-year-old child is most often involved in accidental poisoning, and medicines, especially aspirin, are most frequently ingested. Petroleum products—paints, kerosene and thinners—are the second most common cause of child poisoning, with insecticides and fertilizers the third most frequent poison ingested. In 1958, there were 2,303 cases of child poisoning seen in the 23 East Bay hospitals participating in the study. The association's program has been joined by the Bureau of Maternal and Child Health of the State Department of Public Health, which has begun a three-year study on epidemiology of childhood injuries.

FLORIDA

Dermatologist Receives Award.—Dr. J. G. Smith Jr., assistant professor of dermatology, University of Miami School of Medicine, Coral Gables, received the annual award of the American Dermatologic Association at the association's annual meeting in Atlantic City "for his studies on 'The Aged Human Sebaceous Gland.'" Dr. Smith's studies show that lowering of sebum excretion in the aged female with resulting aging of the skin, is related to the decrease in size and function of the sebaceous gland in women after the menopause. No such change occurs in the aging male.

ILLINOIS

Chicago

Plans for New Hospital and School Buildings.—Mercy Hospital and Loyola University's Stritch School of Medicine disclosed future plans of the two institutions. Mercy will build a new hospital near its present location at 26th and Prairie Avenue; Loyola is studying various proposals for a new medical school building to replace its present structure in the West Side Medical Center. Mercy Hospital, the main teaching hospital for the Stritch School of Medicine, was founded in 1851. The two institutions jointly operate an out-patient clinic at Mercy providing more than 60,000 patient visits annually. Department chairmen at the school have also headed the hospital departments. In 1954, Mercy and Loyola expressed interest in constructing a teaching hospital and medical school near Skokie. The decision of Mercy Hospital to continue to serve the south side "presents Loyola with an opportunity to study various proposals for a new medical school building and teaching hospital." Meanwhile the present affiliation arrangements will continue. A 19-man faculty committee has been appointed to study proposals. Dr. John J. Madden, chairman of neurology, and Dr. James J. Callahan, chairman of bone and joint surgery, will lead the group in gathering proposals for a new medical school building from alumni and faculty.

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education, and public health. Programs should be received at least three weeks before the date of meeting.

MASSACHUSETTS

State Medical Election.—Dr. Lawrence R. Dame, of Greenfield, was named president of the *Massachusetts* Medical Society, succeeding Dr. Charles C. Lund, of Brookline. Other officers elected include Drs. Carl Bearse, Cambridge, president-elect; John C. Corrigan, Fall River, vice-president; Robert W. Buck, Waban, secretary; Eliot Hubbard Jr., Cambridge, treasurer; Norman A. Welch, West Roxbury, assistant treasurer; and Max Ritvo, Brookline, orator.

Dr. McKittrick Honored.—Dr. Leland S. McKittrick, professor of clinical surgery, Harvard University School of Medicine, Boston, received the first alumni citation to a University of Wisconsin medical graduate for "distinction in medicine" at the Medical School's Alumni Day banquet, May 15. In 1950-51, Dr. McKittrick was president of the Massachusetts Medical Society, and from 1951-58 he was a member of the board of regents of the American College of Surgeons. He is chairman of the Council on Medical Education and Hospitals, A. M. A.

MICHIGAN

Hospital Lecture.—Dr. Richard H. Lyons, professor of medicine, State University of New York Upstate Medical College at Syracuse, and former medical director of Wayne County General Hospital, will address the medical staff and the medical alumni of Wayne County General Hospital in the Gruber Auditorium, Eloise, on Wednesday, June 17, 4:30 p. m., on "The Role of the Modern Hospital in Medical Education." The lecture will be followed by the annual dinner of the medical staff at the Hawthorne Valley Country Club.

MINNESOTA

British Lecturer.—Dr. Roderic A. Gregory, professor of physiology in the University of Liverpool, England, gave a lecture on "Physiological Mechanisms of Gastric Secretion" at the Mayo Foundation, Rochester, April 23.

Dr. Love Named President of Cushing Society.—Dr. J. Grafton Love, head, section of neurologic surgery, Mayo Clinic, Rochester, was elected president of the Harvey Cushing Society at the annual meeting in New Orleans, and Dr. Hendrik J. Svien, a member of the section, was elected secretary of the society for a three-year term. Dr. Love will take office in 1961. Dr. Svien previously had been treasurer of the organization. The Harvey Cushing Society has about 700 members, and reportedly is the largest neurosurgical group in the world. It was founded in 1931 and was named in honor of Dr. Harvey Cushing, American neurosurgeon. The objectives of the society are to promote the study and advancement of neurologic surgery and allied subjects related to organic neurology.

NEW HAMPSHIRE

Annual Research Conferences.—The 1959 Gordon *Research Conferences* will be held June 15-Sept. 4 at Colby Junior College, New London; New Hampton School, New Hampton; and Kimball Union Academy, Meriden. The conferences were established "to stimulate research in universities, research foundations, and industrial laboratories." They consist of an informal type of meeting and discussion groups. Meetings are held in the morning and in the evening, Monday through Friday, with the exception of Friday evening. The primary purpose of the program is "to bring experts up to date on latest developments, to analyze the significance of these developments, and to provoke suggestions concerning the underlying theories and methods of approach for making new progress." Attendance is by *application and advanced registration is* required, with a deposit of $15. Fee for attendance is $100. For information write Mr. W. George Parks, Director, Gordon Research Conferences, University of Rhode Island, Kingston, R. I.

NEW YORK

New York City

British Lecturer.—Dr. Kenneth S. Smith, editor-in-chief of the *British Heart Journal* and president of the Life Assurance Medical Society of Great Britain, was guest lecturer at the State University of New *York Downstate Medical Center in Brooklyn*, May 15. Dr. Smith spoke on "Heart Disease and Life Assurance as Related to the New Outlook in Coronary and Hypertensive Disease."

University News.—Dr. Karl Harpuder, attending physician in charge of physical medicine and rehabilitation at Montefiore Hospital in the Bronx, formerly of Munich, Germany, was the second Louis J. Horowitz visiting professor in the department of physical medicine and rehabilitation, New York University–Bellevue Medical Center. The Louis J. Horowitz visiting professorship was created to honor the late Mr. Horowitz, one of the original founders of the Medical Center's Institute of Physical Medicine and Rehabilitation. He contributed and bequeathed about 12 million dollars to the institute since its opening in 1948.——Bernard L. Oser, Ph.D., president and director, Food and Drug Research Laboratoriees, Inc., was appointed a lecturer on the faculty of Columbia University in the Institute of Nutrition Sciences, School of Public Health and Administrative Medicine. Beginning with the spring semester in February, he will give a course of lectures to graduate students on food regulation and safety evaluation.

Fellowship in Medical Neoplasia.—Memorial Center for Cancer and Allied Diseases, training center affiliated with Cornell University Medical College specializing in cancer and allied diseases, announced the offer of special fellowships for study to a limited number of graduate physicians. The purpose and scope of the program is to offer physicians trained in internal medicine the opportunities available at Memorial Center. Activities of the fellow include (1) study of a problem under supervision, to be carried out under the aegis of the lymphoma service of the department of medicine; (2) attendance at a weekly service teaching conference, and medical grand rounds; (3) assignment to surgical clinics and conferences; (4) the integrated study of the hematology and pathology of cancer; (5) observation of the role of the medical consultant to patients undergoing radical surgery for cancer; and (6) opportunity to study the management of patients with lymphomas, leukemias, and allied diseases. Candidates must be graduates of recognized A. M. A. approved medical schools, must have completed or be in process of completing two years of postgraduate training in internal medicine, and must be "of the highest integrity and moral character" and have an expressed interest, both academic and clinical, in the study of malignant neoplastic diseases. The salary stipend is $6,000 a year without maintenance. Appointment is for one year normally beginning July first, renewable for one or two years. Applicants should apply in writing to Dr. Henry D. Diamond, Chief, Lymphoma Service, Department of Medicine, Memorial Center for Cancer and Allied Diseases, 444 E. 68th St., New York 21.

NORTH CAROLINA

Hospital Blood Bank Licensed.—For the first time, a hospital blood bank in North Carolina has been licensed by the Division of Biologics Standards of the National Institutes of Health of the U.S. Public Health Service. The blood bank is that of N. C. Memorial Hospital at the University of North Carolina, Chapel Hill. This accreditation allows N. C. Memorial Hospital to ship blood outside of the state. The blood bank is closely connected with the basic science program of the UNC School of Medicine. The hospital blood bank is directed by Dr. Robert D. Langdell and Dr. Warner L. Wells, faculty members of the School of Medicine.

Study on Choice of Specialties.—The School of Public Health of the University of North Carolina, Chapel Hill, is collecting data from a national sample of physicians in various specialties. The purpose of the study is to identify factors motivating physicians in their selection of particular fields of practice. Data have already been collected from more than 2,600 medical students in a national sample of 10 medical schools. This will be correlated with the information collected from physicians to try to bring out factors operating at various stages of their careers to cause physicians to choose a specialty or general practice. Of particular interest are those specialties in which there is a shortage of physicians such as pathology, public health, and psychiatry. The study now in its third year is expected to last two more years and is supported by a grant from the National Institutes of Health.

Conference of Thai Medical Educators.—The Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, will be host for a three-day conference of all Thai medical educators currently in the United States, beginning on Tuesday, June 9. This workshop in medical education is being jointly sponsored by the China Medical Board of New York, Inc., and the International Cooperation Administration. Dr. Robert W. Prichard, associate professor of pathology, is local chairman for the conference. The meeting is planned and organized primarily for faculty members of two existing Thai medical schools studying American medical education methods. Topics to be discussed will include "The Aims and Objectives of Medical Education," "The Structure and Functions of a Medical School," "The Teacher and the Curriculum," "The Medical Student," and "The Challenge of a New Medical School." The China Medical Board of New York, Inc., will be represented by Dr. Harold Loucks, director, and Dr. Oliver R. McCoy, associate director. The International Cooperation Administration representative will be Dr. E. Harold Hinman, former dean, University of Puerto Rico School of Medicine, San Juan, now chief, Health Resources Staff, Public Health Division. Other participants are: Dr. George T. Harrell Jr., dean, University of Florida College of Medicine; Dr. Howard A. Kline, chief, Education and Training Branch, Division of International Health, U. S. Public Health Service; Dr. Robert A. Moore, president, State University of New York Downstate Medical Center; and Mr. Daniel D. Swinney, training officer, Education and Training Branch, Division of International Health, U. S. Public Health Service.

PENNSYLVANIA

Philadelphia

Dr. Alpers Honored.—Dr. Bernard J. Alpers, head, department of neurology, Jefferson Medical College, was honored May 15, when an oil portrait of him donated by the senior class was accepted for permanent exhibition. A past-president of the American Neurological Association, he is author of "Clinical Neurology."

Dr. Fay Named College President.—Marion S. Fay, Ph.D., has been named president of the Woman's Medical College of Pennsylvania, effective May 1. Dr. Fay joined the faculty of the Woman's Medical College in 1935 as professor of physiological chemistry. In 1943, she became acting dean and in 1946 was named dean of the college. She will continue the duties of dean.

Student Wins Essay Competition.—At the annual meeting of the New Jersey Chapter of the American College of Chest Physicians, Mr. Garret M. Keating, a senior medical student from Hahnemann Medical College was awarded first prize for the "best essay on chest diseases." Competition included senior medical students from New Jersey in any medical school in this country and abroad. His article was "A Review of Injuries to the Thorax: Their Classification and Early Management."

Residency in Pediatric Pathology.—The department of pathologic anatomy of The Children's Hospital of Philadelphia announced that preparations were made to offer a year of residency training in pediatric pathologic anatomy to residents in general pathology completing their second year of formal training in pathologic anatomy. The year of training is approved by the American Board of Pathology toward eligibility for examination by that board. It is anticipated that appointments will be made to begin, generally, about July 1 of each year. Interested physicians should make application to Dr. William C. Yakovac, Director of Pathology, The Children's Hospital of Philadelphia, 1740 Bainbridge St., Philadelphia 46.

SOUTH CAROLINA

Dr. Lynch Honored.—The Alumni Association of the Medical College of South Carolina honored Dr. Kenneth Lynch, president of the college May 13 at Columbia during the state medical meeting. Dr. Lynch has practiced medicine for a half century. Dr. Keitt H. Smith is president of the Alumni Association.

TENNESSEE

State Medical Election.—The following officers of the Tennessee State Medical Association were elected April 14 to serve until April 10, 1960: Dr. Harmon L. Monroe, Erwin, president; Dr. Ralph O. Rychener, Memphis, president-elect; Dr. Rudolph H. Kampmeier, Nashville, secretary-editor; and Mr. J. E. Ballentine, 112 Louise Ave., Nashville 5, Tenn., executive director.

GENERAL

Change of Address.—The Joint Commission on Accreditation of Hospitals has announced that effective May 8, the offices of the commission will be moved from 660 N. Rush St., Chicago 11, to 200 E. Ohio St., Chicago 11.

Pediatric Meeting in Sun Valley.—The Intermountain Pediatric Society will hold its annual meeting at Sun Valley, Idaho, June 26-28. The program will be presented by the following speakers: Drs. Robert H. Alway, San Francisco; Marion E. Lahey, Cincinnati; Ralph V. Platou, New Orleans; and Josef Warkany, Cincinnati. Sessions will be held daily from 8:00 a. m. until noon; round-table luncheons from noon until 1:30 p. m. The meeting is open to all physicians. For information write to the Intermountain Pediatric Society, 2000 S. 9th E., Salt Lake City, Utah.

Proctologists Convene in Atlantic City.—The 58th annual meeting of the American Proctologic Society will be held June 15-17 at the Shelburne Hotel, Atlantic City, N. J. Dr. Karl Zimmerman, Pittsburgh, will present the presidential address at the opening session. Six panel discussions and 12 postgraduate discussion groups are planned. Two symposiums are planned with the following titles and moderators: "The Future of the Practice of Medicine," Dr. Con Amore V. Burt, New York City, and "Ano-Rectal Surgery," Dr. Patrick H. Hanley, New Orleans. A program of exhibits and scientific motion pictures is arranged. The banquet is planned for June 17, 7 p. m. For information write Dr. Norman D. Nigro, 10 Peterboro, Detroit 1, Secretary.

Meeting on Biological Psychiatry.—The 14th annual convention of the Society of Biological Psychiatry will be held June 12-14 at the Claridge Hotel, Atlantic City, N. J., under the presidency of Dr. Joseph Wortis, Brooklyn. Three round-table luncheons are planned: "Toxic Theories of Schizophrenia," "Methodological Problems in Neuropharmacological Research," and "The Significance of Gamma-amino Butyric Acid (GABA) in the Brain." Thirty papers are scheduled for presentation, including "Further Studies on the Use of the Nucleic Acids (Ribonucleic Acid) in the Treatment of Impairment of the Retention Phase of Memory in Aged Individuals," by Dr. D. Ewen Cameron, Montreal, Canada, and "The Reflex Mechanisms of Habituation," by Dr. Eugene Sokolov, University of Moscow, U. S. S. R. A motion-picture program is planned. The annual banquet will be held June 14, 8 p. m. For information write Dr. George N. Thompson, 2010 Wilshire Blvd., Los Angeles 57, Secretary-Treasurer.

Library Association Meeting.—The Medical Library Association will hold its annual meeting June 15-19 at the King Edward Sheraton Hotel, Toronto, Canada. The story of the discovery of insulin by Drs. Banting and Best will be recreated by Dr. William R. Feasby, professor of the history of medicine, University of Toronto. Dr. James K. W. Ferguson, director of the Connaught Medical Research Laboratories, will discuss "Medical Research in Canada." Other speakers include Dr. R. Ian Macdonald and Dr. Stuart D. Gordon who will speak on "Canadian Milestones in Clinical Medicine and

Surgery." Dr. William Boyd will give the banquet address entitled "On Words." Meetings will include a talk by Mr. Scott Adams on activities of the office of science information services and panel discussions on cooperative control of library resources and the medical editor, author, and librarian as a team. The conference will be preceded on Saturday, June 13, by refresher courses on medical library practice.

Prevalence of Poliomyelitis.—According to the National Office of Vital Statistics, the following number of reported cases occurred in the United States, its territories and possessions in the weeks ended as indicated.

Area	May 9, 1959		May 10 1958 Total
	Paralytic Type	Total Cases	
New England			
Main	..	..	..
New Hampshire	..	..	..
Vermont	..	..	..
Massachusetts	..	..	..
Rhode Island	..	..	..
Connecticut	..	..	..
Middle Atlantic States			
New York	2	3	..
New Jersey	..	..	1
Pennsylvania	..	..	..
East North Central States			
Ohio	..	1	..
Indiana	..	..	..
Illinois	1	1	..
Michigan	1	1	..
Wisconsin	..	..	..
West North Central States			
Minnesota	..	..	..
Iowa	..	..	..
Missouri	1	1	..
North Dakota	..	..	..
South Dakota	..	..	..
Nebraska	..	..	..
Kansas	..	1	..
South Atlantic States			
Delaware	..	..	..
Maryland	..	..	..
District of Columbia	..	..	..
Virginia	..	..	..
West Virginia	..	1	..
North Carolina	..	..	..
South Carolina	..	..	..
Georgia	..	..	..
Florida	3	3	..
East South Central States			
Kentucky	..	..	..
Tennessee	1	1	1
Alabama	..	..	..
Mississippi	..	1	3
West South Central States			
Arkansas	2	2	..
Louisiana	..	..	..
Oklahoma	..	..	..
Texas	4	5	5
Mountain States			
Montana	..	..	..
Idaho	..	..	..
Wyoming	..	..	..
Colorado	..	..	..
New Mexico	..	..	..
Arizona	..	..	3
Utah	..	..	..
Nevada	..	..	..
Pacific States			
Washington	..	..	..
Oregon	..	..	..
California	4	5	5
Alaska	..	..	..
Hawaii	..	..	..
Puerto Rico	..	..	3
Total	19	26	21

Ground-Breaking for Library of Medicine.—Ground-breaking ceremonies for the National Library of Medicine will be held at the National Institutes of Health, Bethesda, Md., June 12, 2:30 p. m. Dr. Champ Lyons, chairman, National Library Medical Board of Regents, will preside. Secretary of the Department of Health, Education, and Welfare Arthur S. Flemming, will give an address, and Senator Lister Hill, of Alabama, will turn over the first spade of earth. The library was founded in 1836 by Joseph Lovell, surgeon-general of the United States Army, as the Library of the Surgeon-General's Office. It was developed as a national resource under John Shaw Billings, librarian from 1865 to 1895. In 1922 it was designated the Army Medical Library and in 1952 was renamed Armed Forces Medical Library. In 1956, by terms of Public Law 941, 84th Congress, the library was transferred to the Public Health Service, Department of Health, Education, and Welfare, as the National Library of Medicine. It will be completed in 1961, the 125th anniversary of its founding.

Health Institute in Providence.—On June 17-18 the 25th New England Health Institute will be held at Providence College, Providence, R. I. Presiding at the opening general session will be Dr. Jeremiah A. Dailey, director, Rhode Island Department of Health. Following luncheon, June 17, five groups will be formed developing topics as follows:

Maternal-Infant Health—"Preface to Life" and "Exploring the Baby's World."
Child Health—"Search Begins for Lost 'Normal' Child."
Adult Health—"Meeting the Challenge of Maturity."
Laboratory Section—"Fluorescent Antibody Techniques."
Environmental Sanitation Section—"Control of Additives Used in the Food Industry" and "Anticipated Problems in the Milk Industry."

At the banquet June 17 Prof. William M. Stewart, of Northeastern University, Boston, will speak on "Your Only Problem is People." The closing session will be presided over by Dr. Stanley H. Osborn, commissioner of health, Connecticut State Department of Health. A panel, "Making the Most of What We Have," is planned. Dr. Albert L. Chapman, assistant surgeon general, U. S. Public Health Service, will speak on "Springboard for the Future." Registration fee is $3.

Study in Population Trends.—Better to understand the birth rate, reportedly the most unpredictable component in population growth, scientists at Miami University, Oxford, Ohio, plan a second national study to compare actual childbearing experience with wives' expectations five years earlier, and to assess any changes in wives' plans and attitudes. A Rockefeller Foundation grant of $219,000 to the university will help support the research at the Scripps Foundation for Research in Population Problems over a four-year period. In the first national survey, made in 1955, information was sought of a group of married women of childbearing age concerning the number of children they expected to have and the factors influencing their decisions on family size. The survey data revealed that family limitation was almost universally approved by younger couples of the white population; that physical defects played only a small part in average family size and national population growth; and that the majority of wives wanted families of from two to four children.

Awards for Medical Writing.—The Editors of *Modern Medical Monographs* announced the 1959 competition for unpublished manuscripts on clinical subjects in the field of internal medicine. The purpose of the awards, known as the Modern Medical Monographs Awards, is "to stimulate young physicians to communicate their work in the classical form of the monograph and to achieve high standards of medical writing." The first prize will be $500. In addition, the authors of manuscripts found suitable will be offered a contract for publication under standard royalty arrangements. The entries will be judged for style and clarity of expression by a committee of the American Medical Writers' Association and for clinical interest and scientific value by the Editors and Advisory Board of *Modern Medical Monographs*. The following rules apply:

1. The author must be a graduate physician, less than 40 years of age.
2. Manuscripts (including illustrations, if any) should be submitted in duplicate (original and one copy) by registered mail, postmarked no later than Oct. 1, to Dr. Richard H. Orr, 33 E. 68th St., New York 21.
3. The manuscript, including the bibliography, must consist of not less than 130, or more than 200, double-spaced typewritten pages with one-inch margins, and not more than 30 illustrations.
4. Dr. Morris Fishbein's book, "Medical Writing" (third edition), should be followed in preparation of the manuscript, use of abbreviations, and bibliographical form.

Orthopedic Convention in Lake Placid.—On June 15-18 the American Orthopaedic Association will hold its 72nd annual session at the Lake Placid Club, Lake Placid, N. Y. Guest of honor will be Dr. Wilfried F. H. M. Mommaerts, professor of medicine and professor of physiology, University of California, Los Angeles, who will present "Fundamental Aspects of Muscle Function." The presidential address will be given by Dr. C. Leslie Mitchell, Detroit. The following papers include the invited authors:

Effects Produced in the Cartilagenous Epiphyseal Plate of Immature Dogs by Experimental Traumata, Drs. Crawford J. Campbell, Andres Grisolia, and George Zanconato, Albany, N. Y.

An Evaluation of Epiphyseodesis and Treatment of Leg Length Discrepancy, Drs. Philip D. Wilson, T. Campbell Thompson, and Lee Ramsay Straub, New York City, and Philip A. Granieri, Boston.

The Effects of Continuous Compression of Articular Cartilage, Dr. R. B. Salter, Toronto, Ontario, Canada.

Fibrous Dysplasia: A Twenty-Five Year Study with Follow-Up, Drs. William H. Harris, Patricia H. Benedict, H. Robert Dudley Jr., and Roy Barry, Boston.

Electromyographic Study of Transplanted Muscles About the Knee in Poliomyelitic Patients, Drs. David H. Sutherland, Frederic C. Bost (deceased), and Edwin R. Schottstaedt, San Francisco.

The Anatomy of Congenital Talipes Equinovarus (with Ten Dissected Specimens), Dr. George W. Settle, Baltimore.

Correlation of the Myelogram to Clinical and Operative Findings in Lumbar Disc Lesions, Drs. Edward Lansche and Lee T. Ford, St. Louis.

The Role of Soft Tissues in Osteogenesis (An Experimental Study of Canine Spine Fusions), Drs. Frank E. Stinchfield, Lloyd A. Hurley, and C. Andrew L. Bassett, New York City.

Discussions will follow each presentation. A program of movies is planned, and entertainment includes the golf tournament and the annual banquet, June 17.

LATIN AMERICA

Colombia Ratifies WHO Constitution.—The Pan American Sanitary Bureau announced that the Republic of Colombia ratified the constitution of the World Health Organization, thereby paving the way for that nation's membership in WHO. Colombia was the only State in the hemisphere which had not ratified the WHO constitution since its drafting in 1946 at the International Health Conference in New York. While Colombia has been a member of the Pan American Health Organization since PAHO's beginnings in 1902, the nation's active participation in WHO will facilitate international measures necessary to protect the peoples of the Americas from disease.

FOREIGN

Convention of Chest Physicians in Israel.—The Israel Association of Chest Physicians is organizing a Convention on Epidemiological Problems of Tuberculosis to take place in Jerusalem, Israel, Sept. 22-23, after the 15th International Tuberculosis Conference in Istanbul. Participants from Europe, the United States, and Asia will read papers. Papers on the experience of Israel with the absorption of immigrants from 70 different countries will also be read. Organized tours of the Holy Land will be included. Applications for registration for attendance should be sent to the Israel Association of Chest Physicians, P. O. Box 8123, Jaffo, Israel.

Hematology Society Meets in London.—The seventh congress of the European Society of Haematology will be held Sept. 7-12 in London under the presidency of Dr. John F. Wilkinson. The principal subjects of the congress will be anemia, leukemia, disorders of coagulation and their treatment, problems of bone marrow transplantation, hemoglobinopathies, new hematological techniques, and the detection and significance of weakly reacting blood group antibodies. The official languages are English, French, and German, and simultaneous interpretation will be arranged by the principal lectures. Scientific films and demonstrations are planned, and the social program will include receptions and a ladies' program. The congress banquet will be held Sept. 10. For information write Dr. E. Neumark, Department of Pathology, St. Mary's Hospital, London, W. 2, England.

CORRECTION

Study of Postgraduate Courses.—In the report of the Council on Medical Education and Hospitals (May 9, pages 206-219) several paragraphs were printed out of their proper sequence. The material beginning with the subhead "The Threshold Factor" on page 214 and ending with the last full paragraph on page 217 which concludes with the words "deny this assumption" should have just preceded the summary.

EXAMINATIONS AND LICENSURE

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MEDICAL SPECIALTY BOARDS

American Board of Anesthesiology: *Written.* Various locations, July 8, 1960. Final date for filing application is January 8. Sec., Dr. Forrest E. Leffingwell, 217 Farmington Ave., Hartford 5, Conn.

American Board of Dermatology: *Written.* Several Cities, Oct. 5. *Oral.* Oklahoma City, Jan. 15-18, 1960. The final date for filing all applications is July 1, 1959. Sec., Dr. Beatrice M. Kesten, One Haven Ave., New York 32.

American Board of Internal Medicine: *1959 Schedule—Written*, Oct. 19. Final date for filing application was May 1. *Oral.* For candidates on the West Coast, Portland, Ore., Sept. 9-12. Final date for filing application was March 1. *Oral.* For candidates on the East Coast, Nov. 6-7, 9-10. Final date for filing application was March 1. Sec.-Treas., Dr. William A. Werrell, One West Main St., Madison 3, Wis.

American Board of Neurological Surgery: Examination given twice annually, in the spring and fall. In order to be eligible a candidate must have his application filed at least six months before the examination time. Sec., Dr. Donald D. Matson, 300 Longwood Ave., Boston, Mass.

American Board of Obstetrics and Gynecology: Applications for certificates, new and reopened, Part I, and requests for re-examination Part II are now being accepted. All candidates are urged to make such application at the earliest possible date. Deadline date for receipt of applications is August 1, 1959. No applications can be accepted after that date. Sec., Dr. Robert L. Faulkner, 2105 Adelbert Road, Cleveland 6, Ohio.

American Board of Ophthalmology: *Oral.* Philadelphia, June 2-6; St. Louis, Oct. 6-10. *Written.* January 1960 in various cities. Applications for the 1960 written examination must be filed before July 1. Sec., Dr. Merrill J. King, Box 236, Cape Cottage Branch, Portland, Maine.

American Board of Orthopaedic Surgery: *Part II.* Chicago. Jan. 19-21, 1960. The deadline for the receipt of application is Aug. 15, 1959. Sec., Dr. Sam W. Banks, 116 South Michigan Ave., Chicago 3.

American Board of Otolaryngology: *Oral.* Chicago, Oct. 5-9. Final date for filing application was April 1. Sec., Dr. Dean M. Lierle, University Hospitals, Iowa City.

American Board of Pathology: New Orleans, Nov. 12-14. Final date for filing application is October 1. Sec., Dr. Edward B. Smith, Indiana University Medical Center, 1100 W. Michigan St., Indianapolis 7.

American Board of Pathology: *Examination in Forensic Pathology.* New Orleans, Nov. 13. Final date for filing application is October 1. Sec., Dr. Edward B. Smith, Indiana University Medical Center, 1100 W. Michigan St., Indianapolis 7.

American Board of Pediatrics: *Written.* January 1960. Exec. Sec., Dr. John McK. Mitchell, 6 Cushman Road, Rosemont, Pa.

American Board of Physical Medicine and Rehabilitation: *Written, Part I,* and *Oral, Part II.* Philadelphia, June 12-13. Final date for filing application was February 15. Sec., Dr. Earl C. Elkins, 200 First St., S. W., Rochester, Minn.

American Board of Plastic Surgery: *Oral and Written.* Miami, Fla., Oct. 15-17. Final date for submitting case reports is July 1. Corresponding Secretary, Miss Estelle E. Hillerich, 4647 Pershing Ave., St. Louis 8, Mo.

American Board of Proctology: *Oral and Written.* Philadelphia, September. Final date for filing application was March 15. Sec., Dr. Stuart T. Ross, 520 Franklin Ave., Garden City, N. Y.

American Board of Psychiatry and Neurology: Chicago, Oct. 19-20; New York, Dec. 14-15; San Francisco, Mar. 14-15, 1960. Training credit for full time psychiatric and/or neurologic assignment in unapproved military programs or services between the dates of Jan. 1, 1950 and Jan. 1, 1954 was terminated on Jan. 1, 1959. Sec., Dr. David A. Boyd, 102-110 Second Ave. S. W., Rochester, Minn.

American Board of Radiology: *Examination.* Washington, Dec. 6-9. Deadline for filing application is July 1. Candidates examined in Diagnostic Roentgenology may expect to be examined in Physics. A Special Examination in Nuclear Medicine (for diplomates in Radiology or Therapeutic Radiology) was not given in June 1959. Candidates desiring this examination will be accommodated at the meeting of the Board in Washington, D. C. on December 5. Deadline for filing application is August 1. Sec., Dr. H. Dabney Kerr, Kahler Hotel Bldg., Rochester, Minn.

American Board of Surgery: *Written* examinations (Part I) will be held on December 2, 1959 at various centers to be announced later. Candidates are urged to apply several months before completion of training requirements although the closing date for filing applications is August 1. Those completing training requirements after September 30 cannot be considered for the Part I examination in December of the same year. Sec., Dr. John B. Flick, 1617 Pennsylvania Blvd., Philadelphia 3.

Board of Thoracic Surgery: *Written.* Various centers throughout the country, September 1959. Final date for filing application is July 1. *Oral.* September. Final date for filing application is July 1. Sec., Dr. William M. Tuttle, 1151 Taylor Ave., Detroit 2, Mich.

American Board of Urology: *Written.* Approximately 25 cities throughout the country, December 4, 1959. *Oral-Clinical* and *Examination in Pathology.* Chicago, February 1960. Final date for filing application is Sept. 1, 1959. Sec., Dr. William Niles Wishard, 30 Westwood Rd., Minneapolis 26, Minn.

GOVERNMENT SERVICES

AIR FORCE

Foreign Generals Visit School.—Major Gen. O. K. Niess, the U. S. A. F. surgeon general, and 25 top foreign Air Force surgeons visited the Air Force School of Aviation Medicine at Randolph Air Force Base on April 30. The group made a general orientation tour of selected U. S. government medical service research, clinical, and training facilities. The visiting group included the surgeons general or their representatives from Argentina, Brazil, Canada, Cuba, Chile, Iran, Japan, Mexico, Paraguay, Republic of Korea, Sweden, Switzerland, Taiwan, Thailand, the Philippines, West Germany, and Venezuela.

ARMY

Personal.—Major Gen. James P. Cooney, M.C., has been assigned to Europe as chief surgeon, Headquarters, U. S. Army, Europe, after four years as deputy surgeon general.

Personal.—Col. Harlan H. Taylor, M. C., retired from the Army on March 30 and is now chief surgeon on the passenger liner, President Polk.

NAVY

Personal.—Rear Adm. Lamont Pugh, a former surgeon general of the Navy, has written his autobiography which is entitled, "Navy Surgeon." It is published by J. B. Lippincott Company, of Philadelphia and New York.

VETERANS ADMINISTRATION

Decennial Celebration.—The Veterans Administration Hospital, Houston, Texas, celebrated the decennial of its affiliated operations with Baylor University College of Medicine on April 15. The Administrator of Veterans Affairs, the Hon. Sumner G. Whittier, participated. At a staff dinner, honoring Dr. L. D. Cady, the manager, the Dean's Committee surprised Dr. Cady with an award of merit.

PUBLIC HEALTH SERVICE

Fellowships in Basic Science.—In March, five-year fellowships were awarded to 28 scientists, all of whom have doctoral degrees in medicine, dentistry, or a health-related science. The fellowship program is administered by the Division of General Medical Sciences of the National Institutes of Health. The awards are designed principally for promising young scientists sponsored by university preclinical departments in the period between the completion of their postdoctoral research training and their eligibility for permanent higher academic appointments. Under special circumstances, senior scientists may be awarded these fellowships to supply needed strength in preclinical science departments. The program was started in 1956 with the award of 44 fellowships. The Public Health Service expects to award 40 to 50 new fellowships annually until about 250 have been given. The March awards mark the beginning of the fourth calendar year, with a total of 174 awards made thus far.

The new recipients receiving fellowships are listed in the following table.

State	Recipient	Department	Institution
Alabama	Quigley, Mervyn B.	Anatomy	University of Alabama (Dentistry)
Colorado	Cooper, William G.	Anatomy	University of Colorado
Connecticut	Powell, Wilson F.	Pathology	Yale University
Florida	Schaechter, Moselio	Microbiology	University of Florida
Georgia	Nelson, Leonard	Physiology	Emory University
	Lyon, John B., Jr.	Biochemistry	Emory University
Illinois	Nishimura, Edwin T.	Pathology	Northwestern University
	Combs, C. Murphy	Anatomy	Northwestern University
Louisiana	Geer, Jack C.	Pathology	Louisiana State University
Maryland	Wadkins, Charles L.	Physiology & Chemistry	Johns Hopkins University
Massachusetts	Shuster, Louis	Pharmacology	Tufts University
	Majno, Guido	Pathology	Harvard University
	Padykula, Helen Ann	Anatomy	Harvard University
	Jardetzky, Oleg	Pharmacology	Harvard University
New Hampshire	von Hippel, Peter H.	Biophysics	Dartmouth Medical School
New York	Altszuler, Norman	Pharmacology	New York University
	Lowy, Bertram A.	Biochemistry	Albert Einstein College of Medicine
	Swan, Roy C.	Physiology	Cornell University
	Rogers, Terence A.	Physiology	University of Rochester

North Carolina	Kirshner, Norman	Biochemistry	Duke University
Ohio	Wisotzky, Joel	Pathology	Western Reserve University (Dentistry)
	Green, Gordon E.	Microbiology	Ohio State University (Dentistry)
Pennsylvania	Zilliken, Friedrich W.	Biochemistry	University of Pennsylvania
Tennessee	Grosvenor, Clark E.	Physiology	University of Tennessee
Texas	Critchlow, V. Vaughn	Anatomy	Baylor University
Utah	Eik-Nes, Kristen B. D.	Biology, Chemistry	University of Utah
Washington	Keller, Patricia J.	Biochemistry	University of Washington
Wisconsin	Way, James L.	Pharmacology	University of Wisconsin

Scientists Visit Russia.—Five American scientists, members of a biochemistry delegation, left this country in April for a four-week trip to the Soviet Union to participate in the United States–Russian exchange program. They were Dr. Herbert Carter, Head, Department of Chemistry, University of Illinois, Urbana, Illinois; Dr. Konrad E. Bloch, Professor of Biochemistry, Harvard University, Cambridge, Mass.; Dr. Arthur Kornberg, Professor of Microbiology, Washington University School of Medicine, St. Louis 10; Dr. Albert L. Lehninger, Professor and Chairman, Department of Physiological Chemistry, Johns Hopkins University, Baltimore; and Dr. Bernard D. Davis, Professor of Bacteriology, Harvard Medical School, Boston.

Personal.—Dr. Robert H. Felix, director of the National Institute of Mental Health, was chosen President-elect of the American Psychiatric Association. He will assume the office of president in May, 1960. He served from 1949 to 1958 as chairman of the association's budget committee and was its treasurer in 1958.

FOOD AND DRUG ADMINISTRATION

Pure Food and Drug Violations.—Unfit foods removed from the market during March passed the 1,000-ton mark with the seizure of 61 shipments totaling 1,015 tons. This included 65 tons of frozen eggs made up almost entirely of rotten eggs. Rodent pellet contamination resulted in 16 seizures of bulk wheat and flour, totaling 663 tons. Canned tomatoes, tomato juice, catsup, and tomato puree accounted for 162 of 174 tons of unfit vegetable products seized. Two other seizures stopped 4 tons of dried apples containing insect parts from use by a food processor and 37 tons of canned peaches containing insect parts, fly eggs, and maggots from being served to personnel of the United States Army. Frozen spinach alleged to be adulterated with the pesticide DDT in an amount that may not safely remain in foods without harm to the consumer was seized.

Of 13 drugs and devices seized, 5 were alleged to be misbranded by false and misleading claims. Four were vibrator-massage devices promoted with such claims as weight reduction and relief of nervous tension, cure-all promises, the prevention and cure of serious diseases, even paralysis and heart trouble, and assurance of total health protection and a new way of life. A heat lamp was claimed to benefit sufferers from asthma, arthritis, chest congestion, colds, and hay fever by surrounding them with more healthful air to breathe. A household toilet bowl cleaner did not have the word "Poison" on its label as required by the Federal Caustic Poison Act to help prevent accidental poisonings in the home. Pseudoscience and superstition were the ingredients for promoting a stainless steel wristwatch band as a cure for sciatica, arthritis, bursitis, neuritis, sprains, dislocations, sinusitis, and inflammation. The two Minnesota agents claimed their bracelets contained a tiny generator for converting body heat into "therapeutic" energy. Valued at $3, the bands were being sold for $22.50.

Investigations over several years revealed that Randolph Laboratories, a Division of Randolph Refining Company (a Massachusetts corporation), was actually a one-man firm engaged in repackaging and relabeling multivitamin capsules bought in bulk. Sales and deliveries were conducted by mail to retail dealers. Packaging was carried on in the home basement of a former drug salesman in Wellesley, Mass. The firm shipped products falsely represented to have 2 to 10 times the amounts of vitamins they actually contained and priced to compete with brands put out by reliable firms.

The accused admitted that he had set out deliberately to misrepresent his products for profit because he was in dire financial straits. He said he had been advised this was a good way to make money because no one, including the Food and Drug Administration, checked vitamin products to make sure they contained what they were claimed to have. At sentencing, the judge interrupted the defense plea that consumers had not been injured and said this misrepresentation was an obvious deliberate fraud on consumers and had certainly hurt their pocketbooks, if not their health. The court said that except for the defendant's age and poor state of health he would have been sent to prison. He was fined $1,500.

DEATHS

Atkinson, Donald Taylor Ⓜ San Antonio, Texas; born in Shemogue, New Brunswick, Canada, May 31, 1874; Hospital College of Medicine, Louisville, Ky., 1902; fellow of the International College of Surgeons, American College of Surgeons, and the Royal Academy of Medicine in Ireland; member of the American Academy of Ophthalmology and Otolaryngology, American Association for the Advancement of Science, National Tuberculosis Association, American Genetic Association, American Social Hygiene Association, National Society of Arts and Letters, National Association of Authors and Journalists, and the River Art Group; awarded a medal of merit from the University of Florence for his original researches, as well as a life membership in the National Surgical Society of Italy; associated with Nix Hospital, Santa Rosa Hospital, and Medical and Surgical Hospital; wrote numerous essays and books, including "Great Medical Innovations," "Life Sketches of Great Physicians," "Magic, Myth, and Medicine," and others dealing with his special field of ophthalmology; author of "Texas Surgeon"; received a doctor of science degree from Center College in Danville, Ky., in 1944 and doctor of laws, honoris causa, Huron (S. D.) College in 1945; died in Santa Rosa Hospital March 20, aged 84.

Ausmus, Carl Enlow Ⓜ Jellico, Tenn.; University of Tennessee College of Medicine, Memphis, 1933; died in Clearwater, Fla., March 23, aged 49.

Baker, Bertram Truman, Fort Lauderdale, Fla.; Albany (N. Y.) Medical College, 1912; at one time practiced in Troy, N. Y., where he was on the staff of the Leonard Hospital; died March 31, aged 73.

Barash, David Harry Ⓜ New York City; Long Island College Hospital, Brooklyn, 1911; member of the American College of Cardiology; associated with the New York Polyclinic Medical School and Hospital; died in the Beekman-Downtown Hospital March 19, aged 71.

Bartlett, Mary E., Beloit, Wis.; the Hahnemann Medical College and Hospital, Chicago, 1899; on the staff of the Beloit Hospital; died March 11, aged 89.

Basinger, Adam P. Ⓜ Terrace Park, Ohio; Eclectic Medical Institute, Cincinnati, 1908; practiced in Pleasant Plain and Blanchester; died March 6, aged 77.

Behrendt, Edmund Adelbert Ⓜ Bloomington, Ill.; Northwestern University Medical School, Chicago, 1909; veteran of World War I; on the staff of St. Joseph's Hospital, where he died March 8, aged 76.

Beilby, George Everett Ⓜ Albany, N. Y.; Albany Medical College, 1899; fellow of the American College of Surgeons; served on the faculty of his alma mater; on the staff of the Albany Hospital; died in Pasadena, Calif., March 15, aged 83.

Beisbarth, Carl Conrad Ⓜ St. Louis; St. Louis University School of Medicine, 1926; specialist certified by the American Board of Ophthalmology; member of the American Academy of Ophthalmology; assistant clinical professor of ophthalmology at Washington University School of Medicine; associated with the Barnes, DePaul, St. Louis City, and McMillan hospitals; died March 13, aged 57.

Bennett, Thomas Wade Ⓜ Captain, U. S. Navy, retired, La Jolla, Calif.; University of Nebraska College of Medicine, Omaha, 1925; fellow of the American College of Physicians; member of the American Society of Clinical Pathologists; veteran of World Wars I and II; retired from the U. S. Navy Aug. 1, 1953; died March 17, aged 60.

Bergen, Frank Leslie Ⓜ Burlington, Colo.; Denver and Gross College of Medicine, 1908; died Feb. 25, aged 81.

Bernard, Romeo Armand, Lewiston, Maine; Tufts College Medical School, Boston, 1926; on the staff of St. Mary's General Hospital; died March 3, aged 61.

Blake, Thomas Wallace Ⓜ Seattle; Johns Hopkins University School of Medicine, Baltimore, 1927; specialist certified by the American Board of Radiology; certified by the National Board of Medical Examiners; member of the Radiological Society of North America; veteran of World War I; member of the staff of the Swedish Hospital, where he died March 28, aged 60.

Blick, William, Crafton, Pa.; University of Pittsburgh School of Medicine, 1910; died in St. Margaret Memorial Hospital, Pittsburgh, March 20, aged 77.

Bloomer, Joseph R. Ⓜ Rockville, Ind.; the Hahnemann Medical College and Hospital, Chicago, 1907; member of the American Academy of General Practice; died March 21, aged 77.

Blumgart, Leonard Ⓜ New York City; Columbia University College of Physicians and Surgeons, New York City, 1903; veteran of World War I; past-presi-

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Ⓜ Indicates Member of the American Medical Association.

dent of the New York Psychoanalytic Society; member of the American Psychoanalytic Association and the American Psychosomatic Society; from 1938 to 1950 instructor at the New York Psychoanalytic Institute; served as an associate attending psychoanalyst at the psychoanalytic clinic for training and research of Columbia University; formerly on the board of visitors of Westfield State Farm in Bedford Hills, N. Y.; died March 20, aged 78.

Boyce, Lee Ⓜ San Marcos, Calif.; Jefferson Medical College of Philadelphia, 1903; veteran of the Spanish-American War; formerly practiced in Philadelphia; while in Los Angeles, was affiliated with the French Hospital and the Queen of Angels Hospital; died in San Diego March 12, aged 78.

Brandenburg, Kenneth Charles Ⓜ Long Beach, Calif.; University of Illinois College of Medicine, Chicago, 1926; specialist certified by the American Board of Ophthalmology and the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology and the Association for Research in Ophthalmology; past-president and secretary of the Harbor Branch of the Los Angeles County Medical Association; served as a director of the Long Beach Tuberculosis and Health Association; a member of the staffs of Seaside, St. Mary's, and Community hospitals; past-president of the Mental Hygiene Clinic; served as president of the Lions Club; died March 10, aged 59.

Brant, Cornelia Chase, Bronxville, N. Y.; New York Medical College and Hospital for Women, Homeopathic, New York City, 1903; served as dean of her alma mater; during World War I organized a women's base hospital unit for service in France; associated with the Cumberland Street Hospital in Brooklyn; died March 9, aged 95.

Brawner, James N. Ⓜ Smyrna, Ga.; College of Physicians and Surgeons, Baltimore, 1899; member of the House of Delegates of the American Medical Association in 1923; member of the American Psychiatric Association; past-president of the Fulton County Medical Society; served as medical director of Brawner's Sanitarium, of which he was founder; died March 7, aged 82.

Brown, Oscar Vineyard Ⓜ Island, Ky.; Kentucky University Medical Department, Louisville, 1904; past-president of the McLean County Medical Society; served as a representative in the state legislature and later as state senator; in 1946 became health officer for McLean County, and four years later was health officer for Ohio County, continuing in both offices until his retirement; for many years president of Island Deposit Bank and of the Island Mercantile Company; died in the Owensboro-Daviess County Hospital in Owensboro March 13, aged 84.

Bryan, Samuel Ⓜ Memphis, Tenn.; Harvard Medical School, Boston, 1926; member of the American Academy of General Practice; died March 16, aged 57.

Bubert, John Diederick Ⓜ Baltimore; Baltimore Medical College, 1912; member of the American Academy of General Practice; founding member of the Maryland Academy of General Practice; served on the staffs of the Church Home and Hospital, Maryland General Hospital, and the University Hospital; died in the Union Memorial Hospital March 19, aged 72.

Burke, Rush Pearson Ⓜ Montgomery, Ala.; Columbia University College of Physicians and Surgeons, New York City, 1908; veteran of World War I; died March 19, aged. 74.

Burns, Harry John, Duluth, Minn.; Wisconsin College of Physicians and Surgeons, Milwaukee, 1903; veteran of World War I; formerly associated with the Indian Service; served on the staffs of the St. Mary's and St. Luke's hospitals; died in St. Mary's Hospital March 13, aged 77.

Byrne, William Roger Ⓜ Holliston, Mass.; Middlesex College of Medicine and Surgery, Cambridge, 1916; served in France during World War I; for many years chairman of the board of health; on the staff of the Framingham (Mass.) Union Hospital, where he died March 7, aged 66.

Calvert, Edward Harrison Ⓜ El Cajon, Calif.; Ohio State University College of Medicine, Columbus, 1927; on the staff of the Vista Hill Psychiatric Foundation in Chula Vista; formerly on the staffs of the Mendocino State Hospital, Talmage, and the Atascadero State Hospital in Atascadero; served as consulting psychiatrist for the Department of Correction, State of California; died March 19, aged 70.

Cameron, Prince Wendell, Chicago; Illinois Medical College, Chicago, 1911; died March 24, aged 80.

Carter, Robert Elsworth Ⓜ Jamaica, N. Y.; University and Bellevue Hospital Medical College, New York City, 1927; fellow of the American College of Surgeons; veteran of World War II; specialist certified by the American Board of Surgery; director and founder of the Allied Federal Savings and Loan Association of Jamaica; associated with the Harlem and Doctors hospitals in New York City and the Memorial Hospital; died March 17, aged 58.

Cunningham, Jacob Metz Ⓜ Philadelphia; Jefferson Medical College of Philadelphia, 1912; on the staff of the Chestnut Hill Hospital; died March 14, aged 74.

Digges, Francis Harry, Prince Frederick, Md.; University of Maryland School of Medicine, Baltimore, 1904; retired surgeon, Baltimore and Ohio Railroad; died in the Calvert County Hospital March 3, aged 82.

Dight, Herman Herschel Ⓜ Altoona, Pa.; Jefferson Medical College of Philadelphia, 1901; served as president of the Blair County Medical Society; past-president of the Western Pennsylvania Eye, Ear, Nose and Throat Society; served on the staff of the Wills Eye Hospital in Philadelphia; on the staff of Altoona Hospital; for many years on the staff of the Mercy Hospital; died in the Jefferson Hospital, Philadelphia, March 13, aged 79.

Dodge, Albert Arthur Ⓜ Kalispell, Mont.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1894; past-president of the Flathead County Medical Society; for many years county health officer; for many years on the board of the Kalispell Hospital; died March 3, aged 91.

Dupertuis, S. Milton Ⓜ Pittsburgh; born in Tacoma, Wash., Jan. 31, 1906; Harvard Medical School, Boston, 1932; associate professor of plastic surgery at the University of Pittsburgh School of Medicine; certified by the National Board of Medical Examiners; specialist certified by the American Board of Surgery and the American Board of Plastic Surgery, of which he was chairman; member and past-president of the American Society of Plastic and Reconstructive Surgery; member of the American Association of Plastic Surgeons and the American Society for Surgery of the Hand; fellow of the American College of Surgeons; resigned from the U. S. Public Health Service Jan. 31, 1938; veteran of World War II; president of the staffs of Presbyterian and Woman's hospitals; associated with Eye and Ear Hospital, St. Margaret Memorial Hospital, Children's Hospital, Veterans Administration Hospital, and the Western Pennsylvania Hospital; associate editor, *Journal of Plastic and Reconstructive Surgery;* died March 26, aged 53.

Eagles, Charles Sidney, Saratoga, N. C.; University of North Carolina School of Medicine, Chapel Hill, 1909; died March 5, aged 77.

Eckstein, Joseph Goossen, Cincinnati; Medical College of Ohio, Cincinnati, 1900; veteran of World War I; died March 11, aged 86.

Eggleston, Harry Robert Ⓜ Grand Rapids, Mich.; Detroit College of Medicine and Surgery, 1928; on the staff of St. Mary's Hospital; died March 3, aged 58.

Ervin, John Herbert, Jenkintown, Pa.; Hahnemann Medical College and Hospital of Philadelphia, 1903; member of the staff of the Abington (Pa.) Memorial Hospital; died March 11, aged 79.

Fettig, Carl Alexander Ⓜ Grosse Pointe Park, Mich.; Detroit College of Medicine, 1899; associated with the William Booth Memorial Hospital and the Grace Hospital, Detroit, where he died March 3, aged 82.

Frey, Clarence Wilson Ⓜ Millerstown, Pa.; University of Pittsburgh School of Medicine, 1913; county coroner; member of the Pennsylvania State Coroners' Association; veteran of World War I; at one time practiced in Dallastown, where he was president of the bank; served as president and secretary of the staff of the York (Pa.) Hospital; died March 18, aged 66.

Gallagher, James Leo Ⓜ Buffalo; Baltimore Medical College, 1902; veteran of World War I; associated with the Emergency Hospital and Sisters of Charity Hospital, where he died March 10, aged 81.

Gallimore, Robert Geary Ⓜ Milwaukee; Creighton University School of Medicine, Omaha, 1943; veteran of World War II; died March 2, aged 41.

Gamble, John Ellison, Steubenville, Ohio; Ohio State University College of Medicine, Columbus, 1920; on the staffs of the Ohio Valley and Gill Memorial hospitals; died March 12, aged 67.

Gay, Andrew Jackson Ⓜ Long Beach, Miss.; Chicago College of Medicine and Surgery, 1913; member of the Southeastern Surgical Congress and the American Academy of General Practice; died in Ochsner Foundation Hospital, New Orleans, March 12, aged 70.

Gibby, Harold James Ⓜ Worcester, Mass.; University of Pennsylvania Department of Medicine, Philadelphia, 1908; specialist certified by the American Board of Otolaryngology; on the staff of the Memorial Hospital; died March 2, aged 76.

Gillette, Arthur Edwin, Cincinnati; Medical College of Ohio, Cincinnati, 1893; died March 16, aged 89.

Gilmore, Clifford Freeman Ⓜ Falls Church, Va.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1900; died March 2, aged 87.

Grimm, Emery Gabriel Ⓜ Chicago; Medizinische Fakultät der Universität, Vienna, Austria, 1921; associate in the department of medicine, Northwestern University Medical School; on the staff of the Wesley Memorial Hospital; at one time practiced in Milwaukee, where he was associated with the Sacred Heart Sanitarium and St. Joseph's Convent; died in the Albert Merritt Billings Hospital March 19, aged 64.

Haines, Dempsey D. Ⓜ Charleroi, Pa.; Western University of Pennsylvania Medical Department, Pittsburgh, 1903; associated with the Charleroi–Monessen Hospital, where he died March 15, aged 94.

Harmon, Clair G. Ⓜ Easton, Pa.; Kentucky University Medical Department, Louisville, 1906; served on the staff of the Easton (Pa.) Hospital; died in the Holy Cross Hospital, Fort Lauderdale, Fla., March 8, aged 76.

Harz, John George Ⓜ New Orleans, La.; Medical Department of Tulane University of Louisiana, New Orleans, 1904; also a pharmacist; died March 3, aged 82.

Heise, Carl August, Story City, Iowa; Rush Medical College, Chicago, 1906; died in Ottawa, Kan., March 22, aged 78.

Herff, John Bennett, San Antonio, Texas; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1902; died March 11, aged 80.

Herzog, George Kramer Ⓜ San Francisco; Cooper Medical College, San Francisco, 1901; veteran of World War I; associated with Polyclinic Hospital, Children's Hospital, and the Mount Zion Hospital, where he died March 16, aged 80.

Horn, Clinton, San Mateo, Calif.; Bennett Medical College, Chicago, 1915; served on the staff of the Southern Pacific Hospital in San Francisco, where he died March 6, aged 74.

Howlett, Edward Vernard Ⓜ Pontiac, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1902; fellow of the American College of Surgeons; past-president of the Oakland County Medical Society; chief of staff of Pontiac General Hospital medical staff; died March 12, aged 83.

Hubbard, John Clarence, Oklahoma City, Okla.; Eclectic Medical University, Kansas City, Mo., 1918; chairman of the city-county health board; veteran of World War II; founder, administrator, and consultant of Hubbard Hospital, where he died March 18, aged 74.

Hunt, Kent Noel Ⓜ San Antonio, Texas; University of Texas School of Medicine, Galveston, 1929; veteran of World War II; associated with Nix, Santa Rosa, and Baptist Memorial hospitals; died March 11, aged 56.

Inge, Claude William Ⓜ Concordia, Kan.; Barnes Medical College, St. Louis, 1911; for three years secretary of the Franklin (Tenn.) Medical Society; assistant examiner, Selective Service, Franklin County, Mo., during World War I, and chief examiner, Jewell County, Kan., during World War II; medical director, Farm Security Administration, Jewell County; board member, Kansas Blue Shield; local surgeon, Chicago, Rock Island & Pacific Railway; staff member, St. Joseph's Hospital; died March 2, aged 75.

Jackson, Leland Forney Jr., Baird, Texas; Baylor University College of Medicine, Dallas, 1943; veteran of World War II; interned at the Buffalo General Hospital, where he served a residency; served a residency at the Baylor University Hospital and the Parkland Hospital in Dallas; on the staff of Callahan County Hospital; died in the Harris Hospital, Fort Worth, March 1, aged 41.

Jackson, Thomas Grant Ⓜ Gorman, Texas; Memphis (Tenn.) Hospital Medical College, 1910; served on the staff of the Blackwell Hospital, where he died March 19, aged 76.

Johnson, Lewis David Ⓜ Kansas City, Mo.; Denver College of Medicine, 1899; medical director of the Johnson Hospital in Chanute, Kan., which he owned; died in Santa Ana, Calif., March 2, aged 81.

Juckem, George Joseph Ⓜ Sheboygan, Wis.; Marquette University School of Medicine, Milwaukee, 1915; veteran of World War I; past-president of the Sheboygan Lions Club; past-president of the North Side Bank; died March 8, aged 67.

Kaulbach, Joseph I., Spokane, Wash.; Dartmouth Medical School, Hanover, N. H., 1891; from 1929 to 1940 a Montana state senator from Choteau County; died March 16, aged 96.

Keiser, Forrest Le Grand Ⓜ Columbus, Ohio; Ohio Medical University, Columbus, 1907; served as assistant superintendent and superintendent of the Columbus State School; died March 7, aged 79.

Kelly, Paul Edward Ⓜ Chicago; Northwestern University Medical School, Chicago, 1908; on the staff of the Ravenswood Hospital, where he died March 28, aged 77.

Klein, Abraham Arthur, Hartford, Conn.; University of Louisville (Ky.) School of Medicine, 1929; served as school physician and police surgeon; on the staffs of Mount Sinai and St. Francis Hospitals; died March 3, aged 58.

Knox, Barron Dwinell Ⓜ Springfield, Mass.; Tufts College Medical School, Boston, 1937; specialist certified by the American Board of Urology; member of the American Urological Association; veteran of World War II; consultant, Mary Lane Hospital in Ware, Cooley Dickinson Hospital, Northampton, and the Wesson Memorial Hospital; chief urologist, Noble Hospital, Westfield, Wing Memorial Hospital in Palmer, and the Springfield Hospital; died March 12, aged 47.

Kramer, Abraham Ⓜ Philadelphia; Hahnemann Medical College and Hospital, Philadelphia, 1934; also a graduate in pharmacy; veteran of World War II; died in the Hahnemann Hospital March 27, aged 57.

Lambright, Middleton Hughes, Cleveland; Meharry Medical College, Nashville, Tenn.; 1898; practiced in Kansas City, Mo.; one of the founders, and honorary member of the Forest City Hospital medical staff; died March 21, aged 94.

La Motte, George Althonse Ⓜ Oklahoma City, Okla.; Jefferson Medical College of Philadelphia, 1901; died in the Belleview Hospital March 1, aged 82.

Lowy, Moriz Ⓢ New York City; Medizinische Fakultät der Universität, Vienna, Austria, 1915; associated with the Sydenham Hospital; died March 19, aged 68.

McAlister, Gordon, Highland Park, Mich.; Detroit College of Medicine, 1897; on the staff of the Highland Park General Hospital, where he died March 14, aged 86.

McCleave, Thomas Crooke Ⓢ Berkeley, Calif.; Cooper Medical College, San Francisco, 1896; member of the House of Delegates of the American Medical Association in 1915 and chairman, Section on Diseases of Children, 1915-1916; member of the American Academy of Pediatrics; fellow of the American College of Physicians; veteran of the Spanish-American War and World War I; served as president of the Alameda County Milk Commission and on the council of the American Milk Commission; died March 11, aged 86.

McCrary, John Donald Ⓢ Manhattan, Kan.; University of Nebraska College of Medicine, Omaha, 1950; interned at University of Texas Medical Branch Hospitals, Galveston; served a residency at the University Hospital in Cleveland and the University of Nebraska Hospital in Omaha; for two years served in the medical reserve corps of the U. S. Army; died in Marion, March 6, aged 32.

McGuire, Thomas Edward Ⓢ Glendale, Calif.; Maryland Medical College, Baltimore, 1904; died in the Good Samaritan Hospital, Los Angeles, March 16, aged 77.

McQuarrie, John Gray Ⓢ Richfield, Utah; University of California School of Medicine, San Francisco, 1919; member of the American Academy of General Practice; twice president of the Sevier County Medical Society; past-honorary-president of the Utah Medical Association; during World War II was a member of the Sevier County Selective Service board and received a medal for his services; on the staff of the Sevier Valley Hospital; died March 1, aged 69.

Mabry, Irving Ellis, Bridgton, Maine; Medical School of Maine, Portland, 1909; on the staff of the Northern Cumberland Memorial Hospital; died March 4, aged 80.

Malgeri, John, Newark, N. J.; L.R.C.P., Edinburgh, L.R.C.S., Edinburgh, and L.R.F.P.&S., of Glasgow, Scotland, 1938; veteran of World War II; died in St. Michael's Hospital March 22, aged 51.

Martin, Donald David, Rockford, Ill.; St. Louis University School of Medicine, St. Louis, 1920; served on the staff of St. Anthony Hospital, where he died March 11, aged 66.

Mason, Wilford John, Los Angeles; University of Illinois College of Medicine, Chicago, 1931; veteran of World War II; died March 6, aged 60.

Melton, Andy Singleton Ⓢ Okemah, Okla.; University of Arkansas School of Medicine, Little Rock, 1912; president of the Okfuskee County Medical Society; on the staff of Okfuskee County Hospital; died March 1, aged 73.

O'Connor, Christopher Sebastian, Plattsburg, Mo.; St. Louis University School of Medicine, 1907; died March 7, aged 83.

Olson, Charles August Ⓢ St. Paul; University of Minnesota College of Medicine and Surgery, Minneapolis, 1911; on the staff of the Bethesda Hospital; died March 17, aged 71.

Osborne, Ernest Sumner Ⓢ West Dennis, Mass.; Tufts College Medical School, Boston, 1902; a charter staff member of the Cape Cod Hospital in Hyannis; died March 2, aged 83.

Penrod, Lucian, Taft, Texas; Baylor University College of Medicine, Dallas, 1908; veteran of World War I; died in Sinton March 9, aged 73.

Reeder, Thomas Pickens Jr. Ⓢ Newport Beach, Calif.; University of Texas School of Medicine, Galveston, 1936; interned at Jefferson Davis Hospital in Houston, Texas; served a residency at Los Angeles County Hospital in Los Angeles; veteran of World War II; died Feb. 26, aged 47.

Richardson, James Joseph Ⓢ Fort Worth, Texas; St. Louis University School of Medicine, 1912; specialist certified by the American Board of Otolaryngology; member of the American Academy of Ophthalmology and Otolaryngology; associated with the W. I. Cook Memorial Hospital Center for Children, St. Joseph's Hospital, and the Harris Hospital, where he died March 7, aged 78.

Robinson, William Click Ⓢ Lexington, Ky.; Tulane University School of Medicine, New Orleans, 1942; veteran of World War II; at one time fellow in surgery at Mayo Foundation in Rochester, Minn.; died March 7, aged 41.

Rollings, John Adolph, Richmond, Va.; George Washington University School of Medicine, Washington, D. C., 1912; served in France during World War I; vice-president and director of the Grace Hospital; associated with the Retreat for the Sick; died March 10, aged 69.

Rosenhain, Erich Ⓢ Jackson Heights, N. Y.; Friedrich-Wilhelms-Universität Medizinische Fakultät, Berlin, Prussia, Germany, 1912; died in the Doctors Hospital, New York City, March 3, aged 70.

Rotkin, Meyer M. Ⓢ New York City; New York Homeopathic Medical College and Flower Hospital, New York City, 1916; died March 8, aged 73.

Sample, James Lindsey Ⓢ Hampton, S. C.; University of Georgia Medical Department, Augusta, 1914; died in the Talmadge Memorial Hospital, Augusta, March 5, aged 70.

Sands, Kenneth Fillman, Milton, Mass.; Johns Hopkins University School of Medicine, Baltimore, 1943; veteran of World War II; specialist certified by the American Board of Pediatrics; member of the American Academy of Pediatrics; school physician; instructor in pediatrics at Harvard Medical School in Boston, where he was associated with the Children's Medical Center and the Boston Lying-in Hospital; on the staff of the Milton Hospital and Convalescent Home, where he died March 11, aged 41.

Shaffer, Claude, Houston, Texas; (licensed in Texas, by the years of practice); died in Bryan March 10, aged 93.

Sheehy, Martin James Ⓜ Ridgewood, N. Y.; Columbia University College of Physicians and Surgeons, New York City, 1928; served on staff of the Wyckoff Heights Hospital in Brooklyn, where he died March 2, aged 54.

Somerville, John Wilson, Atlanta, Ga.; University of Virginia Department of Medicine, Charlottesville, 1904; veteran of World War I; served in the regular U. S. Army; died March 6, aged 77.

Southard, Harry Green Ⓜ Marysville, Ohio; Starling Medical College, Columbus, 1906; past-president of the Union County Historical Society; served two terms on Marysville Council and was a president of the Marysville Board of Education; formerly state director of health and health commissioner for Hocking, Vinton, and Athens counties; at one time health director of Union County; died Feb. 16, aged 81.

Swafford, Jesse Brown Ⓜ Chattanooga, Tenn.; Lincoln Memorial University Medical Department, Knoxville, 1915; past-president of the Chattanooga-Hamilton County Medical Society; superintendent of the William L. Bork Memorial Hospital; died March 8, aged 67.

Swan, Horace Cheney Ⓜ Hartford, Conn.; Tufts College Medical School, Boston, 1903; fellow of the American Association for the Advancement of Science and the American Public Health Association; professor emeritus and medical director emeritus of Trinity College; during World War I commandant of American Red Cross Sanitary Unit No. 2 and also served as a contract surgeon for the Army; died March 1, aged 80.

Thomas, Hall H., Denver; Rush Medical College, Chicago, 1906; veteran of World War I; died in February, aged 81.

Wachtel, Jacob Ⓜ New York City; Fordham University School of Medicine, New York City, 1921; specialist certified by the American Board of Dermatology and Syphilology; assistant clinical professor of dermatology and syphilology at the New York College of Medicine; on the staffs of the Jewish Memorial Hospital, Goldwater Memorial Hospital, and the University Hospital (New York University-Bellevue Medical Center); died in the Jewish Memorial Hospital March 11, aged 61.

Wallace, Hamilton Cornwallace, Pottsville, Pa.; Medico-Chirurgical College of Philadelphia, 1906; past-president of the board of health; veteran of World War I; served on the staff of the Pottsville Hospital; for many years physician and surgeon for the Philadelphia and Reading Coal and Iron Company and was medical examiner for the Reading Railroad; died Feb. 9, aged 76.

Wallace, Virgle Wesley Ⓜ Odessa, Texas; University of Oklahoma School of Medicine, Oklahoma City, 1943; interned at the University Hospitals in Oklahoma City, where he served a residency; served a residency at St. Anthony Hospital in Oklahoma City and St. Luke's Hospital in Kansas City, Mo.; fellow of the American College of Surgeons; died Jan. 7, aged 49.

Wardle, Henry Ⓜ St. Petersburg, Fla.; Jefferson Medical College of Philadelphia, 1907; past-president of the South Bristol District of the Massachusetts Medical Society; for many years medical examiner for the Metropolitan Life Insurance Company; formerly practiced in Fall River, Mass., where he was associated with the Union and St. Anne's hospitals; during World War II medical examiner for the Draft Board; died in the Mound Park Hospital March 2, aged 74.

Warner, James Gamble Ⓜ Pittsburgh; University of Wooster Medical Department, Cleveland, 1907; veteran of World War I; for many years practiced in Cleveland, where he was associated with Woman's and St. Luke's hospitals, and member of the Cleveland Medical Library Association; died Feb. 24, aged 75.

Waste, John Morton, Glendale, Calif.; College of Physicians and Surgeons of San Francisco, 1918; for 25 years medical examiner for Equitable Life Insurance Company; died in the Memorial Hospital Feb. 2, aged 79.

Watt, Archibald Henderson Ⓜ New York City; University of Michigan Medical School, Ann Arbor, 1918; on the staffs of the Morrisania and Fitch hospitals, and the Union Hospital, where he died Feb. 23, aged 66.

Wilson, Redford Alexander Ⓜ Tucson, Ariz.; Vanderbilt University School of Medicine, Nashville, Tenn., 1926; member of the American College of Chest Physicians and the American Trudeau Society; fellow of the American College of Physicians; affiliated with St. Mary's Hospital and Tucson Medical Center; died Feb. 13, aged 58.

FOREIGN LETTERS

AUSTRIA

Medical Education.—At a meeting of the Society of Physicians in Vienna the questions of whether there was a shortage of physicians and whether the study of medicine should be encouraged were discussed. For years Austria has been one of the countries with a larger than average number of physicians per unit population—one physician for 563 inhabitants in 1955, as compared to one for 1,692 inhabitants in 1890. This development is responsible for the fact that physicians now have great difficulty getting enough practice to make a living. Until 1957 there was such an excess of physicians in training in hospitals that hospital managers paid only a pittance to the employed physicians. For this reason hospitals, especially in rural areas, have noted a decrease in applicants for jobs as hospital physicians. Some hospitals are now unable to find such applicants. This relative shortage of physicians on one side is in contrast to the large number of physicians who have terminated their schooling and would like to enter private practice. They are prompted to do so because of their desire to make a living for a family of their own and to acquire a home of their own. Service quarters in a hospital are not sufficient in the long run to satisfy these normal desires.

It is not easy for any physician to establish a practice during the first years. This is even more difficult in the overcrowded rural districts and the capitals of the federal states. Without a contract with the state medical insurance funds it is hardly possible for a physician to make a living. In Vienna alone 507 physicians who have opened private offices are waiting for appointments with the insurance funds. This is also the reason for the emigration of about 50 Austrian physicians to Sweden in 1958. It would thus be a serious error to assume that there is a genuine shortage of physicians in Austria, and that, consequently, students should be encouraged to take up the study of medicine. High school students are again and again given misguided advice concerning the medical profession because of unawareness of the true situation on the side of the consultants.

The Austrian chamber of physicians, however, has no intention of cautioning students against the study of medicine, but it does emphasize that an inordinate number of young physicians are working in the university clinics. These clinics are already overcrowded with students and it is becoming increasingly difficult to give the necessary training. The apparent shortage of physicians in rural hospitals is due to uneven distribution.

BELGIUM

Tuberculosis in the Congo.—At the Phthisiology Congress in Brussels in 1958, Kivits stated that in the Belgian Congo tuberculosis was originally a disease of the urban centers but that little by little the disease had appeared in rural areas, being brought there by sick workers leaving their jobs to return to their native villages. Skin tests showed that tuberculosis has reached even the most remote areas. Radiologic examinations showed that the average morbidity in the Belgian Congo was 0.8%. The antituberculosis fight will be effective only if it is based on a general program of improvement of social and economic conditions which influence the diet, housing, and sanitary education of the population. At present the diet is grossly deficient in proteins and the dwellings are particularly unhygienic.

As a result of geographical, social, and economic difficulties it is impossible to construct a sufficient number of sanatoriums. This is why the government has constructed tuberculosis annexes to the general hospitals. The sanatoriums, directed by phthisiologists, remain the pilot organizations of the antituberculosis campaign. Ordinarily, on conversion of the sputum and radiologic stabilization of the lesions, it is necessary to rely on ambulant treatment, especially in the urban centers where the patient is carefully watched. The average period of hospitalization is three months in the cities and one year in the rural areas. In the latter cases patients on the way to stabilization are usually placed in convalescent camps. BCG vaccination does not eliminate the importance of using all other available control measures.

Progress in Tuberculosis Control.—At the same meeting it was pointed out that in general the nutrition of the population has improved in the last 25 years. In 1936 shortages of milk, cheese, vegetables, butter, and fruits and therefore of calcium, vitamin A, and vitamin B_2 were noted. Now the nutrition of the population is not so much a question of budget as of information. The most frequently noted deficiencies can easily be compensated by the daily addition of one-half liter of milk. The pre-employment medical examination of

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The items in these letters are contributed by regular correspondents in the various foreign countries.

all persons under 21 and the annual physical checkup employed persons in this age group must undergo have also helped to reduce the incidence of tuberculosis in adolescents. From 1948 to 1955 the incidence of tuberculosis among adolescents at work fell from 1.55 to 0.23%.

The death rate from tuberculosis has decreased markedly in the last 25 years. The pronounced drop which characterized the immediate postwar period has tended to level off. The difference in death rates for the two sexes was again accentuated. In 1930 there were 87 women for every 100 men dying of tuberculosis; in 1945 there were 56; and in 1956, there were 29. Rates in women have regressed even in the oldest groups, and among women aged 45 and over there has been no notable increase since 1935.

Tinnitus Aurium.—Hicguet and Van Eyck (*Acta Otorhinolaryngologica de Belgique*) differentiated objective and subjective forms of tinnitus aurium. The former results from the transmission to the ear of vascular somatic sounds. The associated deafness is not due to an auricular lesion but results from the masking effect of these sounds. Subjective tinnitus is provoked by an alteration of the auditory structure, and it is always accompanied by true deafness. It can be caused by an obstacle located in the external auditory canal (cerumen, exostoses, or foreign body) or in the middle ear (scar lesions or ankylosis of the ossicles). The most intense subjective tinnitus is due to lesions in or near the auditory nerve, as in patients with aural vertigo, presbyacusia, and tumors of the ear. The factor responsible for abnormal auditory stimulation is usually a disturbance of the autonomic nervous system which produces a vasomotor disorder. It may be reflex in patients with cervical arthrosis or sinusitis; dyscrasic in patients with uremia, hyperglycemia, or cholesteremia; or psychosomatic.

BRAZIL

Nuclear Medicine Center.—On Jan. 25 the Center of Nuclear Medicine of the University of São Paulo was opened. This building centralizes all the medical and biological applications of radioactive isotopes. The basement contains facilities for handling isotopes up to a level of several curies, with a junior cave, master-slave manipulators, and additional space for preparing isotopes for clinical and research uses. This permits the importation of isotopes in large shipments, making them much cheaper. The prepared isotopes are distributed to other floors by a dumb-waiter. The basement also contains decay tanks, an incinerator, a well for radioactive ashes, and general utilities stations. The ground floor includes rooms for examination of patients and isotope diagnosis, several laboratories, and a separate room for the application of therapeutic doses of radioactive substances. There are also two bedrooms where patients are kept while they still constitute a radiation hazard. Auxiliary facilities such as offices, waiting rooms, and coat rooms are included.

The second floor contains a lecture room, student laboratories, auxiliary rooms for teaching, and a library. The third floor is given over to biological research. It contains two radiochemistry laboratories; two counting rooms; a normal chemistry laboratory; several rooms for physics, mechanics, and electronics; a nuclear magnetic resonance–mass spectrometer; and auxiliary facilities for basic research. The fourth floor is only partially used and contains animal quarters, a greenhouse for growing radioactive plants, and the necessary auxiliary services. The concentration of all types of application of isotopes in a single building offers great advantages regarding the best uses of equipment, technical personnel, and isotopes.

DENMARK

Heparin and Tinnitus.—Kaj Zilstorff-Pedersen (*Nord. med.* 61:223-224 [Feb. 5] 1959) reported treating a series of 52 patients who had subjective tinnitus by administering 5,000 international units of heparin intravenously daily for six days. Seventeen of the patients were cured or much improved. In 3 to 10 weeks tinnitus recurred in most patients, but a few injections of heparin again relieved the symptoms. The hearing also became subjectively better in 17 patients, although not always in the same ones in which tinnitus was improved. The subjective improvements in hearing could not be demonstrated objectively.

Phenylbutazone in Ophthalmology.—Poul Svane-Knudsen (*Nord. med.* 61:226-228 [Feb. 5] 1959) used phenylbutazone to treat seven patients with iritis, iridocyclitis, and chronic uveitis, one with diskiform keratitis, and seven with scleritis and episcleritis. In all these patients there was a prompt and powerful analgesic effect and a rapid clearing of hyperemia and exudation in the anterior ocular chambers. A patient with choroiditis did not respond to the treatment. The special indications were (1) postoperative and post-traumatic irritations, (2) tuberculosis or suspected tuberculosis, (3) pituitary basophilism, (4) previous treatment with cortisone, and (5) diabetes with oscillations in the blood sugar level. The drug should be used with caution because of its side-effects.

Pheochromocytoma.—E. Dahl-Iversen (*Acta chir. scandinav.* 116:118-131, 1958/1959) studied 18 patients with pheochromocytomas. In the 15 patients from whom the tumor was removed 14 tumors were intra-adrenal and 1 was ectopic. Among these patients there were no deaths, but the remaining three patients were in such poor condition that they died before the tumor could be localized. Of the 18 patients 3 showed signs of renal failure resembling lower nephron nephrosis. After removal of the tumor and stabilization of the blood pressure 11 of 14 patients had a normal blood pressure whereas three had blood pressures of 150/95 to 160/100 mm. Hg. On reexamination of the 15 patients operated on, after six months to 12 years (average 4.3 years), normal blood pressure was found in 13 and in 2 the blood pressures were 180/130 and 230/150 mm. Hg.

Primary Varicose Veins.—The deep veins of the leg were studied phlebographically by the tilting technique in 275 patients with primary varicose veins by F. R. Mathiesen (*Acta chir. scandinav.* 116:155-162, 1958/1959). In the interpretation of the phlebograms the series was divided according to the following criteria: (1) spindle-shaped dilatation of the veins of the lower leg, (2) filling of the larger muscular veins, (3) filling of fine muscular collaterals, and (4) functional capacity of the deep veins of the leg. Patients with recurrent varicose veins after previous operation showed greater incompetence of the valves of the deep veins, whereas venous dilation seemed to be without importance in the development of varicose veins or accompanying discomforts.

Filling of the large muscular veins might be related to an increased tendency to discomforts and seemed to occur slightly more frequently in patients with recurrent varicose veins after previous treatment, but the study did not allow any definite conclusions on this point. On the other hand it was observed that fine muscular collaterals occurred almost exclusively in patients with varicose veins, in particular in patients who had previously been treated with operation or injection, and that the discomforts seemed to be more frequent and more severe among patients in whom phlebography revealed filling of fine muscular collaterals. On the basis of the investigation it could not be decided whether the frequent occurrence of fine muscular collaterals was evidence of selection because of a special tendency to discomfort in these patients or a sign of venous damage referable to previous operation.

Supracondylar Fractures of the Humerus.—A series of 58 children aged from 6 months to 14 years were treated for supracondylar fracture of the humerus by Frede Bro-Rasmussen and co-workers (*Acta chir. scandinav.* 116:134-143, 1958/1959). Of these 37 fractures involved the left arm. The fractures were reduced by means of the Persson frame in seven and manual reduction was used in the rest. The arm was immobilized with the elbow in about 90-degree flexion and varying degrees of pronation. Thoracobrachial plaster casts were used on 14 patients and various modifications of circular plaster casts on the rest. The duration of immobilization was 3 to 13 weeks (average 6 weeks). Immobilization was recommended for three to six weeks, depending on the severity of the fracture, followed by active exercises to just below the threshold of pain. Irrespective of the principle of treatment used good function usually resulted after supracondylar fractures of the humerus, even though satisfactory reduction might not have been accomplished. Anatomic and cosmetic deformities improved with time.

Increasing cubitus varus deformity due to unequal epiphysial growth was not observed, nor did late ulnar nerve symptoms occur after fractures healed in the valgus position. The physiological importance of the valgus position, which was often pronounced during childhood, was emphasized. Failure to recognize this might be the cause of the occurrence of cubitus varus deformity. The simplest and gentlest method of reduction that gives satisfactory results should be preferred. A method that fulfills these requirements is to place the patient in the prone position with the arm in 90-degree abduction, to exert manual traction on the forearm, with flexion of the elbow joint across the edge of a padded arm table, and to pronate the forearm followed by immobilization in two U-shaped plaster splints or a circular plaster cast extending from the shoulder to the metacarpophalangeal joints. Operative treatment should be considered only when conservative methods have failed to give satisfactory results or when injury to the vessels or nerves have occurred.

Alcohol Sensitivity and Lymphogranulomatosis.—At a meeting of the Medical Society in Copenhagen, Dr. J. Bichel reported on observations at the radium station in Århus concerning the frequency with which patients suffering from lymphogranulomatosis show alcohol sensitivity. It is expressed by severe pain, paresthesia, a sense of oppression, giddiness, itching, dyspnea, shivering, ocular symptoms, nausea, and vomiting on the consumption of a little alcohol. The pain begins only a few minutes after a glass of beer is drunk, and lasts from 30 minutes to three or four hours, sometimes being severe enough to make the patient lie down or resort to drugs for relief. Since this phenomenon was first observed in 1948, all the 166 patients with lymphogranulomatosis coming to the Århus radium station have been systematically examined in a search for it. It was observed in at least 25 patients. At first attention was concentrated on pain, but later other symptoms came more into the foreground; in some patients there was no pain. The pain was usually referred to the area in which lymphogranulomatosis was in an active phase, and it was apt to be worst when the disease was situated in the bones, as it nearly always is when the disease has lasted for several years.

Although tests with small doses of alcohol in a search for alcohol sensitivity were systematically made on the other patients at the radium station, the disease was demonstrable only in one patient who did not have a lymphogranuloma. The reason why the phenomenon in question escaped notice for so long, in spite of lymphogranulomatosis being a well-known disease, might be that its victims were seldom studied in large groups as is now the case at Århus. Bichel's 25 patients all presented the histological picture of classic malignant lymphogranulomatosis.

Pancreatitis.—According to F. R. Mathiesen (*Ugeskrift for laeger,* Jan. 29, 1959) it has long been taught that operations for pancreatitis in an acute phase should be avoided unless there are doubts about its diagnosis, the patient being put on a fluid diet or, in severe cases, fed by parenteral injection with permanent gastric aspiration. Shock was combated by stimulation of the cardiovascular system, and peristalsis was promoted according to need. To see how this doctrine worked in Copenhagen's City Hospital the author checked the progress of the 171 patients treated between 1937 and 1956. Among the 82 men and 89 women 10 had died, 2 of the deaths being postoperative. Among the eight operated on in the acute phase two were suspected of appendicitis, two of intestinal obstruction, three of perforation, and one of incarceration of a hernia. Examinations of the bile ducts were made in 63% of the patients and only 38% of them showed signs of disease. The author's operation rate was low and his mortality was also low compared with those of other observers, hence his enthusiasm for conservative treatment.

Care of Invalids.—The poliomyelitis epidemic of 1952 left in its wake many paralyzed patients whose care in hospital has been costly and monotonous for the patients. A better alternative was found in the form of a 13-story collective house containing private apartments for patients and their families. Eugenie Engberg (*Ugeskrift for laeger,* Feb. 5, 1959) told how respirator patients can be reunited with their families after six years of hospital life. Planned and operated by the Ministry of Social Affairs in conjunction with voluntary organizations, this building has an institutional department on the top floor and 170 private apartments lower down. Special attention is given to the paid employment of relatives who, after a short training in hospital, can take over the responsibility for the daily welfare of the patients at a cost much below that of hospital care. To assist the patients' families sleeping facilities are provided in small private cubicles in the institutional department, in which a professional staff of nurses will be available. By June, 1959, the tenants of the collective house began to move in. Although 30% of the apartments will be reserved for paralytic patients, the remaining 70% can be taken by ordinary tenants whose presence can be counted on to give a normal air to the surroundings.

Niacin for Hypercholesteremia.—Since September, 1956, Dr. P. Eilersen and Dr. N. Hobolth of the Frederiksborg County General Hospital have been investigating the influence of niacin on the concentration of cholesterol in the blood. Their latest contribution to the subject (*Ugeskrift for laeger,* Feb. 5, 1959) concerns eight patients whose serum cholesterol levels were determined before niacin was applied. With 300 mg. per 100 ml. taken as the upper limit of normal, all patients had an elevated serum cholesterol level (over 350 mg.%) before treatment. The dosage of niacin was raised gradually from 0.25 Gm. thrice daily to 1 Gm. thrice daily for 4 to 72 weeks. In all but one patient there was an appreciable rise of the serum cholesterol level during this treatment, and when it was discontinued it fell to the pretreatment level. All eight patients experienced some discomfort at the beginning of treatment, in the form of a sense of heat and tingling of the skin, and two suffered from nausea and vomiting. Of the seven who had cardiac symptoms four found they diminished under this treatment. While niacin would thus seem to be capable of reducing the serum cholesterol level, its ability to prevent arteriosclerosis remains to be proved.

Scalenus Anticus Syndrome.—The scalenus anticus or cervical rib syndrome was discussed by Dr. O. Birn (*Ugeskrift for laeger,* Feb. 19, 1959) of the Sönderborg Hospital where 34 patients underwent scalenotomy for the relief of pain and other symptoms. Three of these patients had this operation on both sides bringing the total to 37 scalenotomies. On follow-up examination 19 were found to be rid of their symptoms and 15 were no better. Of these 15 further examination revealed the underlying cause of the symptoms in several. When first confronted by this syndrome, the surgeon should limit his treatment to infiltration anesthesia of the scalenus anticus, supplemented by physiotherapy and the correction of postural abnormalities. If the resulting benefits are brief, scalenotomy may be resorted to; if it fails the diagnosis should be revised in a search for an alternative explanation of the symptoms. Interpretations of this syndrome have fluctuated in recent times with the assumption, prior to 1927, that a cervical rib is always to blame. Since then growing attention has been paid to the scalenus anticus, whose resection has sufficed to banish the symptoms. In 1935 the syndrome was described in patients in whom no cervical rib could be found.

FINLAND

Spondylolisthesis.—At the orthopedic hospital of the Invalid Foundation in Helsingfors a series of 809 patients with spondylolisthesis or spondylolysis were observed. Reviewing these cases in *Nordisk medicin* for Feb. 26, Dr. L. E. Laurent noted that only 85 patients were admitted to hospital with a view to operation. With males slightly in the minority (46%) their numerical inferiority was most marked in the age group 40 to 49 in which there were 94 men and 149 women, possibly a reflection of the tendency to experience the symptoms of this lesion during the climacteric. Among the 809 patients were 10 whose lesion was discovered incidentally and in the absence of any symptoms. As many as 58 were less than 20 years old. In 52 the origin of the lesion was presumed to be traumatic. The operation was posterior fusion without exploration in 33, posterior fusion with exploration or laminectomy in 13, anterior fusion without exploration in 7, and laminectomy only in 32. A follow-up examination of 77 patients gave the impression that fusion is more effective than laminectomy without fusion. Only in exceptional cases should laminectomy be performed. Even when there are such serious symptoms as prolonged and obstinate pain with incapacity for work, no operation should be undertaken until conservative treatment has been given a fair trial.

Hepatic Cirrhosis.—At the Maria Hospital in Helsingfors Sundberg and Adlercreutz (*Nordisk medicin*, March 12, 1959) observed 226 patients with cirrhosis of the liver (141 men and 85 women) during the period 1945-1956. According to their histories 52 (23%) had a record of acute hepatitis, 89 (39.3%) of alcoholism, and 32 (14.2%) of syphilis. In several patients more than one of these factors may have been operative. While the cause was thus mixed in over 10%, unknown causes accounted for over 32% of the total. In the same period 159 patients with hepatic cirrhosis who died underwent postmortem examination. The causes of death in these patients were hepatic coma in 57 (35.8%), malignant tumors in 22 (13.8%), infections in 19 (12%), other diseases in 14 (8.8%), thrombotic disease in 11 (6.9%), gastrointestinal hemorrhage in 27 (17%), and other hemorrhages in 9. The authors concluded that hepatitis is a more frequent cause of cirrhosis of the liver in Finland than it used to be, but not to such a great extent as in England and Germany.

Acute Bacterial Meningitis.—A series of 379 children aged 14 days to 15 years with bacterial meningitis was studied by Jyrki Kauhtio and co-workers (*Nord. med.* 61:177-180 [Jan. 29] 1959). Neisseria meningitidis was the causal organism in 21%, Diplococcus pneumoniae in 20%, and Hemophilus influenzae in 29%. In 25% of the patients the onset occurred when they were below the age of 3 months, and 67% became ill during their first year of life. The gross mortality was about 70% among children under the age of 14 days, 45% among those 2 weeks to 3 months old, 25% among those 3 to 12 months old, and 16% among those who became ill after their first year of life. Well over 33% of the deaths occurred during the first 24 hours in hospital, and in view of this fact it was considered that the treatment of the initial shock at the time of admission was as important as the institution of specific therapy with antibiotics. As a guide to the choice of a suitable antibiotic the authors recommended, besides examination of direct smears, culture of cerebrospinal fluid and blood before starting treatment.

In meningococcic meningitis sulfonamides and various antibiotics were useful. In pneumococcic meningitis penicillin in massive doses was recommended, and in H. influenzae infection chloramphenicol was preferred. The latter drug was also found to be the safest in those patients in whom the causative organism remained unidentified. Intrathecal administration of antibiotics was unnecessary. With these therapeutic principles mortality in meningitis due to Neisseria could be kept below 5%, in meningitis due to D. pneumoniae below 15%, and in meningitis due to H. influenzae at 5 to 10%.

Routine Urine Testing in Women.—In 500 women nonsterile specimens of urine were first taken for routine examination by Antero Kasanen (*Nord. med.* 61:218-219 [Feb. 5] 1959). In 67.6% the sediment was normal on staining, containing less than four leukocytes per high-power field. In 16.8% the nonsterile specimens gave the same results as sterile control specimens, and in only 15.6% did the nonsterile specimens give a positive result which was not verified by sterile control. Because of the risk of infection at catheterization the nonsterile specimen was recommended for routine use. Only those showing positive results should be catheterized, in the author's opinion.

Funnel Chest.—If reconstruction of a funnel chest is considered indicated, operation should be performed early, since it is easier in younger patients, according to V. Paltia and co-workers (*Acta chir. scandinav.* 116:90-98, 1958/1959). The authors treated 70 patients by a method whose main features were transverse incision, freeing of the origin of the pectoral muscles, subperichondrial resection of the deformed costal cartilages, division of the xiphisternal joint, stripping of the posterior surface of the sternum, and stabilization by means of a metal strut introduced through the sternum with its ends resting on the costal stumps. The strut was removed after three months. The mortality was nil. Pneumothorax occurred as a complication in 11 patients and wound infection in 7. Because of a shift in position the strut was removed less than six weeks after the operation in 10 cases. The result, as estimated either at the removal of the strut or later, was considered good or satisfactory in more than 90%.

GERMANY

Vitamin C Levels.—Czok and Bramsel (*Klin. Wchnschr.* 37:195, 1959) determined the plasma vitamin C level in about 1,200 men and women. The object of these trials was to discover (1) seasonal variations in the vitamin C level and the occurrence of maximum and minimum levels, (2) whether the average vitamin C level in men is different from that in women, and (3) whether the vitamin C level of the persons investigated was satisfactory. Significant seasonal variations in the plasma levels of vitamin C were clearly established, minimum values being observed in May and maximum values in August. On the average, women had a vitamin C level of 0.97 mg.%, while in men the level was about 0.65 mg.%. The authors established a functional relationship between the vitamin C level and the vitamin C intake, whereby a daily intake of the recommended 75 mg. of vitamin C produced a plasma level of 0.85 mg.%. Assuming this to be a standard level, the tests showed that 65% of the men and 40% of the women had subnormal levels. It was concluded that the vitamin C intake of a large proportion of the West German population was less than 75 mg. daily.

Serum Lipid Levels.—Metabolic factors influence the pathogenesis of arteriosclerosis. As we grow older more and more lipids are deposited inside the artery walls. Hyalinosis, lipidosis, and calcinosis are three interrelated processes occurring in arteriosclerosis. Blood lipid values tend to increase in old age, but the increase in the concentration of lipids in the blood is not always concurrent with the changes in the walls of the vessels. Irrespective of the significance one may ascribe to serum lipid concentrations for the development of arteriosclerotic changes, the following facts cannot be ignored: Arteriosclerosis will appear earlier and in more severe form with diseases involving increased serum lipid and especially cholesterol levels, e. g., diabetes, nephrotic syndrome, hypothyroidism, and idiopathic hyperlipidemia or hypercholesteremia. The aging human being shows about the same tendency toward hypercholesteremia as toward arteriosclerosis.

The great scientific significance of metabolism for arteriosclerotic research justifies closer examination of the problem of controlling hyperlipidemia and hypercholesteremia. In the field of endocrine therapy estrogens and thyroid hormones have met with great interest. Experiments carried out by F. A. Pezold (*Ärztl. Wchnschr.* 14:125, 1959) showed that by oral administration of suitable doses of triiodothyronine the serum cholesterol concentration could be lowered. Such tests in humans, however, do not supply conclusive evidence as to whether it will be possible effectively to reduce lipid infiltration of the atheromatous vessel walls, as observed in the high cholesterol intake sclerosis of suitable laboratory animals.

NEW ZEALAND

Breast Feeding.—In the *New Zealand Medical Journal* (57:539 [Dec.] 1958) Drs. Deem and McGeorge reported that of 892 patients admitted to the Queen Mary Maternity Hospital, Dunedin, 76% left the hospital fully breast feeding, 14.8% partially breast feeding, and 9.2% bottle feeding their babies. Primary failure of lactation accounted for almost one-half the cases of artificial feeding on discharge. The various factors leading to later weaning were analyzed. Overdistention of the breasts was found to depend mainly on the volume of milk secreted and the elasticity of the breast tissue. Manual expression of the residual milk at the conclusion of each feeding, by ensuring more adequate emptying of the breasts, prevented the development of excessive milk tension in most patients with elastic breast tissue. A certain proportion of women had small, inelastic breasts which were liable to become overdistended, despite their milk production being inadequate to the needs of the infant. Manual expression also provided a means of estimating the total available milk production on the 4th, 7th, and 10th days of the puerperium.

It was found that the amount of milk taken by the infant was related directly both to his birth-weight and to the amount of milk available in the breasts and that of these two factors adequate milk production was the more important. An easy introduction to breast feeding on the occasion of the first pregnancy is most important as an encouragement to its continuation in subsequent pregnancies. Conversely, discomfort on the first occasion is likely to lead to subsequent antipathy to the procedure. It is important to realize that breast feeding is not an end in itself. Its object is to insure the best possible start in life for the infant, and when it becomes inadequate or difficult there should be no hesitation in changing to artificial feeding.

Hydatid Disease.—Dr. Foster (*New Zealand M. J.* 57:562 [Dec.] 1958) stated that the per capita incidence of hydatid disease is probably higher in New Zealand than in any other country in the world. As a cause of death it is nearly three times as common in New Zealand as in Australia. The New Zealand figure is 20 times greater than that for England and Wales, 78 times greater than that for Scotland, and 125 times greater than that for the United States. In New Zealand the average number of cases reported per year is 87. In a series of 902 patients the liver was involved in 431 (47.8%) and the lungs in 329 (36.5%). The third most common site was the abdominal wall, with 27 patients (3.0%). For patients under 20 years of age the lung was more frequently involved than the liver, but for all patients above 20 years of age the liver was the more common site. This pattern was more marked in the higher age groups. In the 11 years from 1946 to 1956 there were 156 deaths from hydatid disease. A most striking feature was that in hospital patients the disease was over six times as common in Maori men as it was in European men, while for women the disease was over four times more common in Maoris. It also seemed that people living in small towns had a much greater chance of contracting hydatid disease than those living elsewhere. The fact that the rates for forestry workers were higher than those for farm workers is somewhat surprising when it is remembered that a close association with dogs which are fed on raw sheep offal is generally considered to be the principal mode of transmission.

Mitral Surgery.—Drs. Borrie and Campbell (*New Zealand M. J.* 57:571 [Dec.] 1958) reported a series of 20 cardiac operations (17 mitral valvotomies in 16 patients, 2 explorations in patients with mitral regurgitation, and a successful cardiac massage for cardiac arrest during induction of anesthesia). Patients with pure mitral stenosis subjected to mitral valvotomy ranged in age from 15 to 58 years. Three of the patients were three to seven months pregnant. The outcome was successful, thus showing that if it is required for medical reasons valvotomy can be accomplished without any ill-effect as late as the 28th week of pregnancy. It removes a circulatory obstruction which might precipitate acute pulmonary edema at the onset of labor. Cardiac arrest occurred during induction of anesthesia in one patient and was successfully treated by transabdominal cardiac compression. A successful valvotomy was performed two months later. Restenosis occurred in one patient, necessitating a second valvotomy.

There were no operative deaths in the group of patients with pure mitral stenosis. There were three late deaths, one occurring 9 months and two 27 months after operation. The remaining 13 patients were well when last seen, had a greatly increased tolerance for effort, required no further treatment, and were considered to have achieved satisfactory results. The two patients explored had severe mitral regurgitation with heart failure. One had a cusp deformity of the posterior commissure. Despite successful splitting of the anterior commissure her regurgitation persisted and she died eight hours after operation. The other had a widely dilated valve ring with severe regurgitation. This finding formed the basis of experimental work on sheep to narrow the mitral ring by placing a circumferential suture around the mitral ring. These experiments, conducted in 1953 and 1954, evolved a method which was discovered independently and simultaneously by Davila and Glover of Philadelphia and has been successfully applied by them to human beings.

Whooping Cough Immunization.—Dr. Aicking (*New Zealand M. J.* 57:633 [Dec.] 1958) stated that immunization against whooping cough has been the subject of prolonged widespread controversy since it was first described by Nicolle and Conor in 1909. Deaths from whooping cough in New Zealand in recent years have exceeded those from diphtheria, scarlet fever, measles, and smallpox combined. The disease causes more childhood deaths than any other single communicable disease. The authors sent 540 questionnaires to parents of children in the 6-to-7-year age group in the Dunedin area, 460 of which were returned. The following conclusions were drawn: The incidence of whooping cough in Dunedin since 1950 was less than 25% in children up to 7 years of age. This was much lower than figures generally quoted in other countries and was only about 33% of the incidence reported in Dunedin in 1933. Almost 70% of children in the community had received *some* immunization against whooping cough. All but a few had had combined vaccine. Only 50%, however, had received a full course of vaccine.

The age of immunization was fairly satisfactory, 70% receiving it before their first and 90% before their second birthday. The value of immunization seemed clear-cut. Nonimmunized children showed an incidence of whooping cough 3.5 times greater than that of those who had been fully immunized. Unimmunized children were twice as likely to develop whooping cough after close exposure to other cases. Children receiving only two immunizing injections had an incidence double that of children receiving three injections. This indicates the importance of the third injection. There was some evidence to suggest that immunity tends to decrease two years after immunization. If this is true, an earlier booster shot might be of value.

UNITED KINGDOM

Poliomyelitis Immunization.—Parkins and co-workers studied the effect of a third or booster dose of poliomyelitis vaccine in a group of 80 infants who at the time of the primary immunization were aged 10 weeks or less (*Brit. M. J.* 1:680, 1959). The booster dose was given 10 to 12 months after the primary immunization. In 17 of the 80 a rise in antibody titer occurred between the primary immunization and the booster dose, suggesting that these infants became infected with poliomyelitis in this period. They were excluded from the assessment of the effects of the booster dose. Infants who showed an increase in antibody level after primary immunization responded to the booster dose, but they had low levels of antibody transmitted from the mother. Those who had high antibody levels at birth and gave no primary response did not react to the booster dose at 10 to 12 months. Some with intermediate levels of maternal antibody who had not reacted to the primary immunization did so when the booster dose was given. Evidently they were immunized by their first dose, but the rise in titer was masked by the maternal antibody.

Generally speaking, those infants who were immunized when 10 weeks old responded better to the booster dose than those given primary immunization at between 1 and 6 weeks. These observations showed that the immunization of infants against poliomyelitis in the first 10 weeks of life was unsatisfactory. This was particularly true of the response to type 1 virus. The authors believed that the earliest age for mass immunization against poliomyelitis should be 6 to 9 months.

Psychiatric Research Urged.—The government should enable more scientists to embark on mental health research work, according to Ian T. Henderson, who spoke at the annual meeting of the Mental Health Research Fund in London. In four years the fund has made grants to 48 research workers. The quality of applicants for grants is high and the competition keen, but at present a research career in mental health offers few opportunities and rewards. Although mental patients fill one-half the hospital beds in Great Britain, the volume of research in this field is meager compared to other branches of medical research.

Shortage of Chiropodists.—Statutory registration for chiropodists is more than ever necessary, according to a spokesman for the Society of Chiropodists, if enough qualified men and women are to be available to run the new National Health Service foot clinics. Freedom for local health authorities to start such clinics was announced by the Minister of Health. It will be difficult, however, to find enough qualified people to staff the new clinics. The few local authorities who already have such services have great difficulty in recruiting trained chiropodists. About 90% of the qualified members of the profession are private practitioners. It might be better to leave them as such and to have patients in need of chiropody obtain it through their family doctors. The new service should be based firmly on medical need. The patient suffering from diabetes or some other disorder should be given priority over the healthy woman with corns which, though admittedly painful, are due purely to "shoe-vanity." The physically handicapped, for whom the Minister recommends priority, will need to be closely defined, otherwise a full national service will be attempted, and there are neither the personnel nor the facilities for it.

Establishment of foot clinics on a country-wide basis would involve heavy expenditure in buildings, equipment, and staff. It is doubtful how many chiropodists in private practice would be prepared to abandon their practices to staff the new clinics. Much pioneer work in the provision of chiropody for the elderly has been done by voluntary organizations. After April 1, 1959, local health authorities were free to contribute to the funds of such organizations for the purpose of providing foot treatment for the elderly. The chiropody service was criticized by the National Corporation for the Care of Old People, because the patient could not go to the chiropodist of his choice, and there might not be enough clinics in some areas. No mention has been made of a domiciliary service, and for the aged this would be an important aspect. Many elderly people are housebound, sometimes largely because of the condition of their feet. A special scheme for domiciliary chiropody was tried in Dorset. The cost of a service for older people would be about $4,900,000 a year. This is not unduly large if it keeps older people mobile and independent.

Hospital Construction Plans.—Britain's physicians are pressing the government to embark on a 10-year plan of new hospital building costing 2.1 billion dollars. The scheme is the work of two surgeons, Mr. A. Lawrence Abel and Mr. Walpole Lewin (*British Medical Journal,* supplement, April 4, 1959). It is not so much more beds or more staff that are required, but up-to-date buildings constructed for present-day medicine and not for medicine of 100 years ago. The General Medical Services Committee, which negotiates for the 20,000 general practitioners in the National Health Service (NHS), urges increased access of general practitioners to hospital beds. Before the government is approached the report will be considered at the British Medical Association's annual meeting in Edinburgh in July.

The cost of the NHS is a constant worry, but people are beginning to recognize the fact that some of this cost is due to the enforced and uneconomic use of outworn buildings. Cheap buildngs and temporary constructions prove extremely costly to maintain. It has been estimated that $2,800,000 spent on modernization schemes involves an extra $1,120,000 in subsequent running costs, whereas $2,800,000 spent on new hospital building leads to only $420,000 extra in running costs.

Since everything cannot be done at once, the first priority would seem to be to insure that in every large population area there is one efficient general hospital with a 24-hour resident medical and nursing staff. Although we need new hospitals, this does not necessarily mean that we need more hospitals. It may be that more old hospitals need to be pulled down than new ones built. New towns where there are no hospital services should have first priority. Old people's homes, more home nurses, and other services for the elderly could reduce the demand for hospital beds. Some patients do not require full nursing facilities, and for them a special wing should be run more on hotel lines, with a cafeteria and only basic supervision.

New Fellows of the Royal Society.—Among the 22 new fellows of the Royal Society are several physicians. Dr. J. F. Tait and his wife were elected fellows in recognition of their work on adrenocortical hormones. In 1952 they discovered aldosterone by chromatographic fractionation of the adrenal cortex. Prof. Franz Bergel was given the fellowship for his work on synthetic organic compounds in the fields of vitamins and cancer. His early work was on the chemistry of aneurine, riboflavin, pyridoxine, lysergic acid, and anticholinesterases. More recently he has been engaged in the synthesis of cytotoxic drugs for the treatment of malignant disease. Dr. D. W. Henderson was elected in recognition of his investigations on the transmission of organisms causing respiratory disease in experimental animals. His work has thrown light on the size of infecting particles and the spread of infection. Dr. Ann Bishop received her fellowship for contributions on drug resistance in the chemotherapy of malaria. Dr. R. D. Keynes was elected for his investigations on the transmission of nervous impulses. Drs. F. H. Crick and M. F. Wilkins have been working on the molecular structure of desoxyribonucleic acid and the protein molecule.

Medical Students on Medical Education.—In one of the papers in the final examination in medicine at Manchester University, the candidates had a choice of one of six essay questions. Black analyzed the essays written on the subject of improvement in medical education (*Lancet* 1:673, 1959). The students demanded a broad general education, including languages, and a firm grounding in science. The course in anatomy came under fire. The commonest complaint was that principles were lost in a mass of detail, and it was suggested that dissection could largely be demonstrated rather than performed. If this were done the preclinical course could be shortened, provided applied anatomy and physiology were taught in the clinical period. Some students stressed the importance of surface anatomy; others saw no reason why medical students should learn any more anatomy than students of physiotherapy or even nursing.

Suggestions were made that teaching and examinations in pathology, bacteriology, and pharmacology should be completed in an extended preclinical period. Some students thought that the emphasis in pharmacology should be laid more on practical therapeutics. Nearly all the students considered that opportunities for residence in or near the hospital should be increased, so that more emergency work and practical procedures could be performed. It was generally thought that students should be given more responsibility with the patients. There was some difference of opinion as to the most suitable time for demonstrating physical signs. Some thought that these should be learned as soon as possible; for example, during the first clinical appointment.

Another majority opinion was that much more time should be given to training in general practice. Three months of work with a general practitioner was suggested. According to some students more emphasis should be placed on instruction on sexual matters and the study of mental disease and drug addiction. It was suggested that attendance at lectures should be voluntary and that many of the lectures should be replaced by a tutorial system. One of the most revolutionary suggestions was that all examinations should be replaced by tutors' reports.

Siamese Twins Separated.—Siamese twins, joined by the crowns of their heads, were successfully separated by a neurosurgical team headed by Dr. J. O'Connell, at St. Bartholomew's Hospital, London. The twins were two of triplets born in May, 1958. Preliminary radiologic investigations were made to determine the position of the main blood vessels in the brains of the two infants. The chief difficulty, which had been foreseen, was the anatomic arrangement of the cerebral vessels and the possibility of hemorrhage from them during and after the separation. A preliminary operation was performed to fashion skin flaps to enclose the separated heads. Some freeze-dried dura mater to cover the separated brains was flown to the hospital from the United States Naval Medical Center at Bethesda, Md. The final operation took nine and one-half hours. The babies were given daily physiotherapy before the operation, as their union had prevented them from making many of the movements normal in infancy. The infants survived the operation. Their heads, however, became heavily infected, and one of them developed meningitis

12 days later. This was controlled by chemotherapy. Should the infants eventually survive they will wear caps of reinforced material, like motorcyclists' crash helmets, to protect the brain until the skull stops growing. Then they will be provided with metal skull plates of tantalum or Vitallium.

Anticoagulant Therapy After Cardiac Infarction.—The Medical Research Council (MRC) conducted a controlled clinical trial to assess the value of long-term administration of anticoagulants after a cardiac infarction (*Brit. M. J.* 1:803, 1959). Although there are many reports in the world literature there have been few controlled trials, and most of the pioneer studies can be criticized because of the heterogeneity of the clinical material, the use of "historical" controls with inadequate matching, failure to use strictly random series of patients, and failure to take into account both timing and duration of the period of exposure to the risk of recurrent infarction and death during the follow-up of the groups being compared. In the MRC trial 383 patients who had recovered from the acute phase of a cardiac infarction of defined severity were classified according to their previous infarct history and allocated at random in a hospital center to one of two groups. The patients of one group were given the anticoagulant phenindione in doses large enough to increase the prothrombin time (measured by Quick's one-stage method) by 2 to 2.5 times. The other control group received tablets of similar shape and size but containing only 1 mg. of the anticoagulant, which is a therapeutically ineffective dose.

Both groups of patients were seen at regular intervals of two to three weeks and clinically assessed more fully by radiologic and electrocardiographic methods every three months. Rigid diagnostic criteria governed inclusion in the trial. Q-wave evidence of infarction was essential. The age range was from 40 to 69 years, and treatment began within a month of the diagnosis of infarction. Patients who had recovered from the acute phase of a cardiac infarction of defined severity were subdivided according to their previous infarct history and then randomly allocated to one of the groups. Patients were excluded from the trial if they had any nonvascular condition likely to cause death within two years; if they had had a hemorrhage from any cause in the previous six months; or if they suffered from malignant hypertension, peptic ulcer, valvular heart disease, cardiac failure, or syphilis. Patients taking large doses of salicylates, which affect the prothrombin time, were also excluded.

Three indexes of the effectiveness of treatment were used, namely, death from all causes from cardiovascular disease in general and from recurrent myocardial infarction in particular; frequency of myocardial reinfarction of varying degrees of severity; and subsidiary data on return to work and the presence or absence of anginal pain or dyspnea at the time of the last examination. The follow-up period was one to three years. Of the men in the control group 18% and in the group treated with phenindione 10% died during the follow-up period. The difference was not statistically significant. The corresponding figures for women were 17 and 11%, also not significant because of the small numbers. When infarcts serious enough to cause permanent withdrawal from the trial were added to deaths as a combined index of therapeutic success or failure, there was a significant reduction in their frequency in men, particularly in those under 55 years of age receiving the therapeutic dose of the drug. Under the age of 55 treated men suffered recurrent infarctions at only 20% of the rate of the controls, and over that age the rate was halved in the treated group. The difference in the death rate in the treated and untreated groups was most evident in the first six months of the follow-up period. The disparity in the reinfarction rate was maintained for at least two years and persisted longer in the treated men than in those of the control group who returned to work. As would be expected there were more hemorrhagic complications in those receiving therapeutic doses of phenindione than in the controls.

Radioisotopes in Drinking Water.—The fall-out of radioactive strontium and radioactive cesium in rain has been measured for the last five years, but not much is known about its effects on the supplies of public drinking water. The Atomic Energy Research Establishment at Harwell published the results of some preliminary investigations which show how these isotopes have penetrated certain drinking water sources (Preliminary Survey of Radio-Strontium and Radio-Cesium in Drinking Water in United Kingdom, Her Majesty's Stationery Office, 1959). Tests were made of lake waters in seven large areas (Liverpool, Manchester, Leeds, Birmingham, Cardiff, Glasgow, and mid-Northamptonshire). The mean level of Sr^{90} in these waters was 0.45 $\mu\mu c$ per liter, which represented about 15% of the content of rain water at that time. There were differing ratios between Sr^{89} and Sr^{90} which reflected the effect of reservoir storage on the age of the water. River sources supplying Coventry, Oxford, and London had a mean Sr^{90} content of 0.24 $\mu\mu c$ per liter, or about 10% of that of the rain water. Well waters supplying Wolverhampton, Cambridge, and Brighton had very low values for Sr^{90}—less than 0.01 $\mu\mu c$ per liter. This was less than 1% of that in rain. The highest level of radioactive cesium was in river water. If the ordinary person drinks 1.5 liters of fluid daily, these lake and river waters would contribute an extra 10% of Sr^{90} to the diet. The contribution of well waters would be negligible.

CORRESPONDENCE

TREATMENT OF GONORRHEA

To the Editor:—A story in the *New York Times*, March 7, is based on the article "Failure of Penicillin in Treatment of Acute Gonorrhea in American Troops in Korea," by Capt. Ernst Epstein, in The Journal, March 7, 1959. The Journal reached me on March 10, 1959. I should like to comment on the article.

Penicillin-resistant urethritis due to proved Neisseria gonorrhoeae is nonexistent. This holds for every place in the world; I have visited practically every capital and many not so important centers on the six continents and Japan. Urethritis resisting adequate dosage of penicillin was not, and the persistent discharge after adequate dosage of penicillin is not, due to gonococci. Adequate penicillin dosage consists of injection of the content of a vial of procaine penicillin G in oil with 2% aluminum monostearate, labeled as containing 3 million units. A variation to 10% at the time of bottling is permitted. Laboratory and clinical bases sustain this practice. Warfield Garson, M.D., in his paper on "Evaluation of Gonorrheal Therapy," presented at the U. S. Public Health Service Venereal Disease Seminar at Detroit, Feb. 20, 1957, said: "I cannot resist the temptation to bring to your attention the fact that those organisms showing a sensitivity above 0.2 [units per ml.] would be potential treatment failures when given the usual 600,000 units of Bicillin by intramuscular injection. . . . The parenteral use of 1.2 million units of Bicillin (All Purpose) will, on the other hand, give a level in excess of the highest in vitro minimum inhibitory concentration of the gonococcus for a period of approximately twelve hours and will remain in excess of 0.2 units per ml. of serum for at least twenty-four hours. . . ." Garson recognizes "the dangers involved in assuming in vitro results to be necessarily valid in the in vivo situation."

Garson quotes Preston and Dunsworth: "These authors, working at the County Health Department in Columbia, S. C., undertook to find the reason for high treatment failure rate of gonorrhea in females. . . . They conclude that 1.8 million units of PAM is necessary for an acceptable rate of cure of gonorrhea in females. . . . It was demonstrated that penicillin when applied to the medium (HeLa cells and rabbit fibroblasts) would kill the extracellular gonococci but would not affect the intracellular organisms." Garson is certain from the results of the laboratory and clinical findings that "we should raise our dosage sights for the routine treatment of gonorrhea, at least in females."

Captain Epstein writes: "The fact that bacterial culture studies were not done will no doubt be held by some as contributing to failure to establish the diagnosis." Work by Durel and others in Paris, reported in French publications, proves that urethritis in the male is associated with diplococci identified by fermentation tests as Neisseria meningitidis and the little known Neisseria pharyngis sicca (at least two types). Neisseria catarrhalis and Diplococcus crassus are found in urethritis of the male. The dictum of 1939 is condensed in the sentence: "A gram negative diplococcus present in the discharges from an acute purulent urethritis is the gonococcus." This concept is neither accepted nor acceptable in 1959!

Epstein's paper has this provocative paragraph: "It should be pointed out that reinfection cannot possibly explain treatment failures in patients in whom N. gonorrhoeae [only on morphologic and tinctorial evidence—H. G.] was demonstrated in the discharge while the patient was on penicillin treatment. The daily dose of penicillin used is several times as great as the amount needed for effective prophylaxis of gonorrhea."

It is recognized that N. catarrhalis, N. pharyngis sicca, and D. crassus do not respond to any dosage of penicillin. Experience everywhere proves that no one of the modern antibiotics destroys nonbacterial causes of urethritis in the male. They are in the domain of the urologist.

I am often asked, in distant geographical areas, to discuss failure of penicillin therapy in the treatment of urethritis. Laboratory studies in these areas do not include the fermentation tests for biological properties of the neisseriae. Hence, the title of Epstein's paper should be "Failure of Penicillin in the Treatment of Acute Urethritis." Reference to N. gonorrhoeae as the cause of penicillin-resistant urethritis should be deleted.

I deplore the prepublication newspaper accounts based on the article in The Journal. The damage is beyond estimate. The hopes of thousands of infected persons rightfully entitled to adequate dosage of penicillin, dashed to the ground, can be restored by competent discussion and equal publicity in the nonmedical press.

Herman Goodman, M.D.
18 E. 89th St.
New York 28.

To the Editor:—Dr. Goodman's letter raises several points which I would like to answer. I have questioned dozens of military physicians in Korea and Japan, and everyone who had personal experience in treating gonorrhea commented on the problem of penicillin treatment failures. Curtis and Wilkinson (*Brit. J. Ven. Dis.* 34:70-82 [June] 1958) document their experience with the bacteriology of penicillin failures in gonorrhea. Their studies, as well as the discussion appended to the paper, indicate that penicillin-resistant cases of gonorrhea are being encountered in Britain. Bernstein, of the 406th Medical General Laboratory at Camp Zama, Japan has intensively investigated the bacteriology of penicillin treatment failures. Using rigid laboratory criteria he proved that these were indeed Neisseria gonorrhoeae *infections* and that the in vitro penicillin sensitivity of these strains was definitely, although moderately, elevated.

By measuring in vivo penicillin blood levels, Bernstein showed that the usual penicillin schedules failed to produce bactericidal penicillin levels against resistant strains. He suggested more massive amounts and recommended that 900,000 units of aqueous suspension of procaine penicillin G be given in each of two daily injections, three hours apart, for three days—a total of 5,400,000 units. This regimen has been very successful. Kern treated more than 50 consecutive patients in this manner with but one failure. Grosshandler increased Bernstein's schedule to 1,200,000 units at each injection and had no failures in a series of about 70 patients with gonorrhea.

I treated 85 consecutive patients who had gonorrhea with an aqueous suspension of crystalline procaine penicillin G alternately by one of three methods: (1) 600,000 units daily for five days (29 patients); (2) 600,000 units twice daily, 12 hours apart, for five days (28 patients); and (3) 900,000 units twice daily, 3 hours apart, for three days (28 patients). There were four failures in group 1 (14%) and four failures in group 2 (14%), but in group 3 there was only one failure (4%). While not statistically overpowering, these results agree with those of others and indicate that if high enough penicillin blood levels are achieved, penicillin failures are infrequent.

Dr. Goodman believes that the cases of penicillin failure are actually cases of nongonorrheal urethritis misdiagnosed as gonorrhea. He notes that the factors causing nongonorrheal urethritis do not respond to penicillin. With this I agree. If we are misdiagnosing nongonorrheal urethritis as gonorrhea, increasing the amount of penicillin should have no effect on the failure rate. The virtual elimination of penicillin failure with massive penicillin therapy also eliminates Dr. Goodman's explanation.

The purpose of my paper was to call attention to a phenomenon which had not been adequately reported in the literature. It was carefully pointed out that the failures occurred with penicillin dosages generally considered more than adequate. No statement was made that other antibiotics were to be preferred to penicillin or that penicillin in other schedules would not be curative. I still believe penicillin to be the drug of choice in treatment of gonorrhea, and when resistant strains are encountered the routine penicillin treatment should be modified along the lines recommended by Bernstein. Ideal penicillin schedules in these circumstances remain to be defined.

Ernst Epstein, M.D.
807 W. Fifth St.
Marshfield, Wis.

MISCELLANY

SO YOU HAVE BEEN ELECTED

A MESSAGE FOR NEW OFFICERS OF COUNTY MEDICAL SOCIETIES

David G. Welton, M.D., Charlotte, N. C.

You have been honored by the recognition received from your colleagues and your community, and you are wondering how to go about the year's activities—what goals to try to attain. Like other golden opportunities yours offers a few traps along the way. Beware of the attitude of some when elected to a high office by colleagues—the belief that above all you must avoid conflict and controversy and have a nice, smooth, pleasant year. This—if accomplished—may be pleasant, but it is stagnation, and in the medical profession we cannot afford stagnation. We have never tolerated it scientifically and we must not tolerate it in the programs of our county societies. This magnificent country was neither created for nor built by people who feared conflict and controversy. These are unavoidable by-products of progress.

From my own experience there is hardly such a thing as a "noncontroversial subject" in a county medical society; I found that not all of my colleagues could agree even on the matter of celebrating the 50th anniversary of our society. Constructive projects and programs, when carried out, will strengthen you, your society, and organized medicine as a whole, in spite of opposition which may be encountered along the way. Mr. Ralph Cordiner, president of General Electric Corporation, recently said, "Civilization is moved forward by restless people, not by those who are satisfied with things as they are." This applies perfectly to the medical profession today.

I can say in all earnestness, with no hesitation and no exaggeration, that the opportunity ahead of you right now, particularly those of you who are serving this year as presidents of your societies, is the biggest opportunity for service to your colleagues that you will have in your lifetime. More can be accomplished at the county level than at any other level of organized medicine. The officers and staffs of our state and national organizations perform chiefly policy-making and administrative duties and provide materials and technical assistance for us to use at the grass-roots level. But it is up to us at the county level to put these plans and policies into effect and to make a success of them. Why? Because we operate on a person-to-person basis daily. We have a direct personal relationship with each of our colleagues in our respective societies and with each of our patients.

You will soon realize that the honor of being president or secretary is paralleled by responsibility. There are times when you must speak and

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Read before the Conference of County Medical Society Officers and Committeemen, Pinehurst, N. C., Jan. 10, 1959.

act in the name of the membership without consultation. Do not be afraid to do so. Have confidence in yourself; after all, your colleagues have confidence in you, and that is why you have been elected. I repeat: serving your county medical society is the finest opportunity for group and community service you will ever have; make the most of it. Dedicate yourself this year, and set aside some time regularly every week for county medical society work.

This means at least one afternoon and one evening a week, perhaps more, depending on the size of your society and the extent of your program. It means time on Sundays, particularly since this is a legislative year and you must do some visiting with our state legislators. Certainly this will be a *sacrifice—you will rob most of this time from your* family, some from your hobbies, and some from your practice; but taking this time, investing it regularly, and using it productively will make the difference between a successful officer with a year of accomplishment and a mere figurehead. What is the difference if you make a little less money? That will mean less tax. What you will gain cannot be measured in dollars and is tax-free. Service to others is the best protection against monotony and selfishness, just as occasional participation in a scientific program is insurance against intellectual stasis.

Some of you may be tempted to depend on a "one-shot deal" to make your year a success. I mean one big effort during one week or one month. Let me illustrate by telling you about a Protestant minister who was having difficulty filling his church. He decided that what would help most would be a revival meeting featuring a big name singer. With the help of his church leaders he arranged this and obtained Tennessee Ernie Ford to sing. Tennessee Ernie came, the church was filled, and he sang a fine program. After he finished "When the Roll Is Called up Yonder, I'll Be There," people streamed down to the front and the triumphant preacher signed up 200 new members. In an effort to meet this competition the Catholic priest across the street arranged a similar occasion and obtained Perry Como as the big attraction. Again, his church was packed and Perry sang a beautiful program, closing with "Ave Maria." Women wept and fainted; men and women came forward, and the excited father signed up 250 new members. The following week these two clergymen were having lunch with the rabbi in their town and boasted about their recent successes. When the rabbi heard of the surprising response they had achieved, he hustled back to his office, got busy on the telephone, and finally obtained Eddie Fisher for a big evening service. Members of his congregation advertised and promoted this occasion, and the synagogue was packed; people were sitting on the window sills. Eddie sang a fine program, closing with "There's a Gold Mine in the Sky," whereupon one-half of those present left immediately and went to the airport. So never put all of your "program eggs" into one event. I am confident that you all know it will take persistent and consistent effort throughout the year to achieve what you ought to and want to accomplish.

Committees

As an aid to planning, coordinating, and assigning jobs I have found it convenient to group committees as follows: (1) those committees which serve your society, (2) those concerned with public relations activities, and (3) advisory committees.

Service to Your Society.—The service group includes the board of censors and committees for orientation of new members, grievance, nominating, programming, finance, entertainment, welfare, and hospital relations. Your board of censors, which passes on new applicants, has a serious responsibility in checking their credentials, but the job should not end there. It should include orientation, which means getting the new doctor acquainted with the other physicians in your society, with the medical facilities in your community, and with the general range of fees in your community. This last point is especially important.

Grievance committees have proved their value; if your society does not have one, start one. Detailed information about how to do it can be obtained from state societies and from your neighboring societies.

In all these committee assignments and in the organization of your society keep in mind the value of continuity. Sometimes this may require a change in your bylaws; if so, have them changed. Continuity is particularly important in the board of censors and the grievance, finance, and public relations committees. In order to achieve it it is best to have staggered terms of more than one year each. This will prevent your starting out each year with inexperienced men on important jobs.

Public Relations.—It is important to have a basic public relations committee, plus subcommittees to take care of emergency and information service; legislation and public health; press, radio, and television; insurance; youth service; community fund drives; diabetic detection committee; and any special projects that come up. Depending on the size of your organization you may set up a subcommittee for each of these or you may have to depend on members of your single public relations committee to take care of one or more of these functions.

You have just been supplied with a check list of public relations activities. Few societies can do everything on this list, but you should keep increasing the number of these activities in your program each year. I would like to pass on to you what I consider the best definition of public relations, which comes from Mr. William Neal of Winston-Salem, N. C., a highly respected leader of public relations in the banking industry. "*Public* relations is doing those things in a continuous and organized way which will bring public understanding, approval; and support. It is based on (1) good performance, and (2) effective interpretation." This can be the keystone for your entire society's program.

All of us have been brought up on good performance; it is the effective interpretation that we do not know enough about. In the last few years, however, organized medicine has approached this matter in a realistic and constructive manner. All you have to do now is ask; your state society and the American Medical Association will supply you with more good material than you can digest. I strongly recommend this to every one of you—get a little indigestion this way. We must not sit back now and let the wind blow, ignoring attacks on us. Likewise, the defensive is a poor position in the public's eye. We must take a positive stand and coöperate with the various mediums which disseminate information to the public.

Advisory Committees.—The third group of committee functions is served by the advisory group, including such things as membership on the boards of local chapters of the American Cancer Society, the heart associations, the chamber of commerce, the women's auxiliary, Red Cross organizations, and local boards of health.

At first you may ask what business the medical society has in all of these organizations. You may be reluctant to participate in all of them, but the fact is that when one of these groups asks you for representation and help, you should be flattered. We have all heard a great deal about the loss of prestige and respect of the physician in his community during the past 30 years; therefore, when we get a request like this, it shows that people still have a healthy respect for us and look up to us, and it is up to us to maintain this desirable position by participating and lending a helping hand where we can. This will take time, but it will be time well invested for everyone concerned. The enthusiastic acceptance of such a request is in itself a positive public-relations step in the right direction, and many times it turns out that you have to spend less time than you expected.

I want to emphasize the importance of an active relationship with your local chamber of commerce. Remember that the future of private practice in this country probably lies in the legislatures of our states and in our congress. We have been told by experts that we must increase our contacts with our legislators. In addition to reaching them in organizations of physicians, the impact will be increased if we join in the chamber of commerce in each of our communities and, through them, the United States Chamber of Commerce. This organization, locally and nationally, represents all business and professional men. In most of the social and economic issues facing us businessmen agree with us. It will help our position and improve the effectiveness of our efforts if we join with each chamber of commerce locally and help them with their legislative efforts. Join your chamber of commerce, get your colleagues to join, see that you have good executive personnel, and help them improve their programs.

Efficiency and Cooperation

A word about the actual running of your meetings: It is important to establish and to maintain high organizational morale. Run a well-knit organization, what the navy calls a "taut ship." Keep the key men on their toes with frequent contact; by putting your time in and working hard regularly you will inspire them to do the same. You must have efficient cooperation in order to get results. Go to each meeting with a prepared agenda and an order of business conforming to your bylaws. Be familiar with each item on the agenda before the meeting is called to order; know parliamentary procedure. Your time and the time of each member of your society is valuable; having things organized ahead of time will do much to prevent aimless discussion and waste of time.

In looking ahead, I believe your main problem is going to be getting a sufficient number of your colleagues to work with you. Sir William Osler pointed this out many years ago: "By far the most dangerous foe we have to fight is apathy—indifference from whatever cause, not from a lack of knowledge, but from carelessness, from absorption in other pursuits, and from a contempt bred of self-satisfaction." So be prepared for it, do not be discouraged by it, and have a plan to meet it. Remember, and remind them, "you can't hit the ball with the bat on your shoulder, you've got to get out there and swing!"

In closing I want to emphasize three main points: 1. Have a positive program. 2. Get your colleagues to work with you. 3. Work hard at your program and have some fun while you're working. A short verse from Emerson is appropriate:

Life is too short to waste
In critic peep or cynic bark,
Quarrel or reprimand:
'Twil soon be dark;
Up! Mind thine own aim, and
God speed the mark!

IN MEMORY OF ALEXANDER VON HUMBOLDT

Walter K. Frankel, M.D., Newark, N. J.

Alexander von Humboldt, a renowned scientist, died 100 years ago on May 6, 1859. Ninety years ago the leaders of official, scientific, and intellectual circles of the New England states assembled in Boston to honor the 100th anniversary of his birth. The main speaker at that celebration was Louis Agassiz, world-famous American scientist, who had developed in the thoughts and ideas of Goethe and von Humboldt. *Oliver Wendell Holmes*, Harvard's eminent pathologist and man of letters, read a long poem on Humboldt, comparing him with Napoleon but giving the laurels to Humboldt whose scientific conquests on three continents were peaceful ones; Ralph Waldo Emerson said of Humboldt that he had bound together the continents. For more than four years he explored the unknown parts of Central and South America where he was the first to climb the Chimborazo, one of the highest mountains of our globe. When he returned to the United States from this expedition in 1804 he was the honored guest of the President of the United States, Thomas Jefferson, at Monticello. A year later he stood on top of Mount Vesuvius, beside him one of his greatest admirers, the youthful Simon Bolivar, who became the great *liberador*. And 25 years later, at the request of his friend Alexander, the Russian Czar, Humboldt made his famous 90-day expedition from St. Petersburg to the Chinese border and along the Himalayas, the Siberian steppes, and the Caspian Sea back to the Russian capital. As a result of this unique scientific expedition Russia established meteorological observation stations from the Neva to the Bering Strait.

Humboldt contributed also to scientific medicine. In Goettingen he learned anatomy under the great anatomist Blumenbach, and in 1797 he published a physiological study, "Experiments on Irritated Muscle and Nerve Fibre with Considerations on the Chemical Process of Life in the World of Animals and Plants," in which are enumerated more than 4,000 experiments, many of them made on himself. In that year he was in Jena, in close contact with Goethe and with Schiller who, as a former military surgeon, was interested in physiological problems. While Humboldt was preparing an expedition to the West Indies he again took up the study of anatomy. He told a friend that he often worked six or seven hours a day under the supervision of Professor Loder, who also was Goethe's instructor in anatomy, dissecting human bodies.

In his first book after his return from the "equinoctial Americas," his "Views of Nature," published in 1807, Humboldt reported on quinine from the Chinese forests of Loxa, with an impressive history of its medical use, and on the use of curare as a muscle-paralyzing poison, of which he brought the first plants to Europe. In "Kosmos," his great work published in four volumes between 1845 and 1858, and finished one year before his death, he gave a historical review of the development of Arabian medicine from the 10th to the 15th centuries.

Goethe often pointed out how Humboldt stimulated his own scientific studies—many of them in the field of medicine—but the great influence of Goethe on Humboldt was acknowledged in a letter in which he said that "in the forest of the Amazone River as well as on the crest of the high Andes" through Goethe's ideas he "became elevated, nearly provided with new organs."

MEETING OF THE AMERICAN COLLEGE OF PHYSICIANS

At the Chicago meeting in April the American College of Physicians for the first time in its history held a special symposium, not primarily for doctors, but for about 200 business executives and community leaders. One purpose of this symposium was to acquaint these lay leaders with the functions of the internist, a specialist whose professional qualifications and procedures are not generally as well understood as those of, for example, the surgeon or the dermatologist. The subject was "The Care and Preservation of the American Executive." Dwight L. Wilbur, president of the college, was moderator. Dr. Walter L. Palmer, Chicago, outlined the benefits derived from medical research in the last 25 years.

Dr. William C. Menninger, Topeka, Kan., speaking on emotional disturbances said that hate in the form of resentment, selfishness, and jealousy causes most of the world's troubles. Our mental health depends on how we individually handle these emotions. Although we cannot always rise above our hatreds we should not let them dominate our lives. To do so is to become trapped in the pursuit of unimportant goals from which no real satisfaction can be derived. Other important factors in mental health are having a hobby you get real fun out of, taking pride in your work, and having in addition to your work a constructive mission so big that it cannot possibly be completed in your lifetime. Whether we like to admit it or not, we must strive for security throughout our lives; if we achieve it too completely, we will lose our zest for life.

Dr. Chester M. Jones, Boston, said that about 0.4% of the adults in the United States now have some form of cancer and 25% of them will have it at some time in their lives. He predicted that steady progress in both the prevention and the treatment of cancer would be made. Dr. Irvine H. Page, Cleveland, said that to avoid a heart attack the average executive should get more physical exercise, avoid overweight, and take steps with the advice of his doctor to reduce his blood pressure if it is abnormally high. He advised that we avoid excesses but not miss anything.

Dr. Henry L. Bockus, Philadelphia, urged executives to be more alert to early signs of mental fatigue which can lead to premature senility in themselves and their junior assistants. He wished to revise the oft-heard statement that a man is as old as his arteries to read, a man is as old as his weakest vital organ. With regard to forced retirement he said that no one should ever retire from an active interest in service to others, in the life of the community in which he lives, and in the occupation to which he has devoted the major part of his life. The symposium was received with such enthusiasm that it may become a regular feature of these meetings.

THE LEISURE CORNER

COLLECTING WALKING CANES

The collecting of walking canes is a fascinating hobby. Private collections of canes usually average from 25 to 50 sticks but often run into the hundreds. The hobbyist's interest in a particular cane will center on its origin, the manner in which it was obtained, the material of which it is made, or the history of its former ownership. The cane collector may have inherited the object of his pride, received it as a gift, or made it himself.

An unofficial cane census for the United States taken not many years ago revealed that there are more than 5,000 canes in private collection, more than 10,000 in museums, and several million in actual daily use. No doubt the number has increased considerably since the estimation. Of course, canes are most helpful to persons temporarily or permanently disabled; but the universal appeal of the walking cane lies in its leisure use.

The word "cane," incidentally, was first applied to the walking stick about 1540, when a cane was made, "garnished with gold having a perfume container in the top" as well as other conveniences. Many centuries before there were evolved from the cave man's club different staves, from 5 to 6 ft. in length, including the shepherd's staff for guiding and directing straying sheep, the pastoral staff which served as an emblem of episcopal authority, and the pilgrim's staff, with a knob placed in the middle for a grip. Gradually, the length of the staff was reduced so that the holder could grip it at the top, and as a result cane makers began to make attractive handles of porcelain, ivory, and such costly metals as gold and silver.

Next the inventive cane makers devised conveniences to be concealed within the handles, such as weapons, spectacles, and perfume and medicine bottles. Sword or dagger canes found immediate favor with some sportsmen, as did gun or pistol canes. The decanter cane, which had wide appeal, was hollow inside and fitted with a glass tube in which a quart of liquor could be stored. From County Wicklow in Ireland came the shillelagh, a blackthorn sapling with a crooked root-knot for the grip, ornamented with a picturesque array of wart-like lumps.

Every country on earth has an indigenous cane. An artistically carved olive wood cane, with a camel's head for a handle, comes from Turkey. France has a cane of woven grass; Scotland, a thistle cane; Switzerland, a horn-and-hoof cane representing an Alpine goat; the West Indies, a lemon wood cane; the Philippines, a cane made of bones; and Cuba, a cane of shark's vertebrae. In certain remote regions of Africa, the tribal chieftain's cane is made with a large ball for the grip. Legend has it that the ball represents the most the chieftain can get into his mouth; hence, the bigger the ball the greater the chieftain. In the United States there are canes with handles that represent the faces of well-known persons; for example, Will Rogers, Franklin D. Roosevelt, William Jennings Bryan, William McKinley, and even William Shakespeare.

Robert Ripley, the famous creator of "Believe It or Not," was one of the best-known collectors of canes. While his personal collection was not the largest in the world, it contained many rare and exotic items. The Ripley collection included a cane made from the rib of a whale; a violin cane, probably the most unusual of all, which contained a playable violin with a bow; and a "blackout" cane, which had been used in England by Winston Churchill.

The story of the most famous cane associated with the medical profession appears in a book called "The Gold Headed Cane." This cane was the companion of five famous English doctors, and was transferred from one to the other. The widow of the fifth owner presented the cane to the Royal College of Physicians in London, where it is preserved. It is a Malacca stick with a crossbar for its handle, and it is decorated with the coats of arms of the doctors who owned it.

American doctors in the past have had a professional rather than a personal relationship to walking canes. Many doctors in the last century kept a collection of canes in their offices for the purpose of circulating them among patients who required them. During the latter decades of the 19th century there lived, in a small village in Kentucky, a bearded, old-fashioned physician known in the community as "cane-toting Doc Smith." This appellation had been bestowed on him because he always had handy, in his small office as well as in his one-horse buggy, a supply of courtesy canes, which were loaned to patients requiring their aid during convalescence.

There is also a story about a physician who lived in a midwestern city and had a great many talents, painting pictures, writing poetry, and playing several musical instruments. His very special hobby, however, eccentric though it may have been, was to wait for a heavy snow and then sally forth with his cane, drawing pictures in the snow for the amusement of the neighborhood children. There was another doctor who was a self-serving apothecary. He carried a cane with a gold head which contained a vial of ammonia and camphor, to be used in reviving women who fainted in public places.

Today's cane-minded doctor should find a new vista opening up when he considers the manifold uses to which a walking cane can be put. As its devotees know, the walking cane can be carried for sheer amusement rather than for actual support. For those who like to walk, the cane is a well-mannered companion, never talking back, but permitting its owner to entertain his hands as he reflects on the happenings of a busy medical day.

MEDICAL LITERATURE ABSTRACTS

INTERNAL MEDICINE

Potassium, Digitalis and the Heart. C. Fisch, E. F. Steinmetz, A. F. Fasola and B. L. Martz. J. Indiana M. A. 52:192-197 (Feb.) 1959 [Indianapolis].

The major effects of oral or intravenous infusion of potassium on the electrocardiogram are mentioned. In the presence of normal renal function a human being cannot ingest sufficient amounts of potassium to produce significant electrocardiographic changes because of gastric irritation. However, studies in animals show that acute loading with 1 mEq. per kilogram of body weight by the oral route may elevate serum potassium to toxic levels. The excretion of potassium after acute loading has been investigated under various states of renal function. In congestive heart failure a negative potassium balance usually exists. The effect of the oral administration of large amounts of potassium was investigated in patients with compensated heart disease and in those with heart disease with congestive failure. Those with heart failure showed poorest tolerance for potassium, with the highest rise of plasma level and a parallel low renal excretion of the cation. Normal subjects excreted most of the administered ion within 3 hours, and their plasma levels were low.

Chemical analysis of myocardial tissue in congestive failure revealed an absolute diminution of intracellular potassium with a concomitant rise in intracellular sodium. Differential analysis of the right and left ventricles showed that this decrease is more pronounced in the chamber "primarily" responsible for the congestive failure. Digitalis tends to reverse this process. It maintains the intracellular to extracellular ratio of potassium by aiding in the transport of potassium into the cell, or preventing the egress of this cation from the cell. On the other hand, it is pretty well agreed that toxic doses of digitalis result in egress of potassium from the cell. As potassium is extracted, symptoms and electrocardiographic changes suggesting digitalis intoxication become evident, and these can be reversed by administering potassium salts. In clinical practice the problem of potassium balance is further complicated by anoxia and by the use of acidifying agents, carbonic anhydrase inhibitors, mercurial diuretics, and sodium and potassium removing resins. The occurrence of the signs and symptoms of digitalis intoxication, after the use of mercurial diuretics, has been attributed to mobilization of digitalis from the edema fluid, but more recent studies have shown that digitalis intoxication occurs after diuresis during which significant amounts of potassium are lost.

During the past 3 years the authors made a systematic study of the effect of potassium on cardiac arrhythmias associated with digitalis therapy. Their studies not only failed to demonstrate any lasting benefit of potassium in the treatment of ventricular ectopic rhythms accompanying digitalis therapy but also suggested that potassium may actually potentiate digitalis toxicity. They feel that the observed effect of potassium on ectopic ventricular beats, with parallel depression of atrioventricular conduction, is best explained by the known nonspecific depressing effect of potassium on the myocardium. They emphasize, however, that their results to date apply only to intravenous injections of potassium of 5 mEq. per kilogram, at a rate of 0.5 to 1.0 mEq. per minute, to patients who have, as best as can be determined, normal total body potassium.

Unilateral Peripheral Facial (Bell's) Paralysis in Infectious Mononucleosis (Differential Diagnosis of Pfeiffer's Disease). L. Amann. München. med. Wchnschr. 101:270-271 (Feb. 13) 1959 (In German) [Munich, Germany].

Infectious mononucleosis, known also as Pfeiffer's disease, is probably a disease of the reticuloendothelial system of virus origin. This explains the extreme multiformity of its symptomatology, referred to by some as the "amazing masquerade" and by others as its "protean nature." On the basis of the history of a 5-year-old boy, the author shows that the neurological manifestations of infectious mononucleosis may cause it to be mistaken for poliomyelitis. Two days before this boy was hospitalized, his mother had noted that the angle of his mouth was drooping. Severe perspiration was observed during the night, and on the following

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The place of publication of the periodicals appears in brackets preceding each abstract.

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day swelling of the cervical lymph nodes was noted. The otolaryngologist who was consulted suspected poliomyelitis and advised hospitalization.

When the boy was examined on admission, it was found that all 3 branches of the facial nerve were paretic, but otherwise there were no neurological symptoms. The tonsils were somewhat red but not coated. Painful lymph nodes, the size of plum pits, could be palpated in the submandibular and submental regions and along the sternocleidomastoid muscles. The spleen was noticeably enlarged and tense, and the liver slightly protruded beyond the costal arch. The temperature was slightly above normal for the first 4 days but then became normal. The sedimentation rate of the erythrocytes was noticeably accelerated. The blood picture with the large number of monocytic cells was pathognomonic for infectious mononucleosis. The weakly positive Hanganatziu-Deicher reaction, the cervical lymphomas, and the swelling of the spleen corroborated this diagnosis. The author feels that, since there was no indication of any other etiology, the peripheral facial paresis must be ascribed to the infectious mononucleosis.

There is a considerable literature on neurological manifestations of infectious mononucleosis. Estimates of their incidence vary from about 1 to 10%. They assume many forms, such as serous meningitis, meningoencephalitis, central or peripheral paresis, sensory disturbances, convulsions, polyradiculitis, neuritis, and psychotic changes. Together with other neurological symptoms, central or peripheral paresis of the facial nerve has been observed in about 14% of the patients with neurological complications, but isolated facial paresis has so far been reported in only 4 other patients with infectious mononucleosis. The time of occurrence of the neurological symptoms has varied between the 1st and the 40th day of the disease. It has been suggested that corticotropin or cortisone might favor the development of neurological complications in infectious mononucleosis.

Thyroiditis and Struma Lymphomatosa (Hashimoto). L. E. Christensen. Ugesk. læger 121:129-131 (Jan. 22) 1959 (In Danish) [Copenhagen].

Some of the less common thyroid affections, including light cases of acute, nonsuppurative thyroiditis and particularly lymphomatous struma, will cause diagnostic difficulties. In acute thyroiditis the most important and most constant finding is the low absorption of radioiodine (I^{131}) in the gland. It is thought that in the 2 cases of acute thyroiditis reported the increased protein-bound iodine (PBI) inhibited the production of thyrotropic hormone and glandular absorption of iodine. Both patients reacted with a powerful increase in the absorption of I^{131} after stimulation of the thyroid gland with thyrotropic hormone (TSH). In the first case treatment with cortisone in usual dosage had a striking effect; in the second case spontaneous recovery occurred. In the third case described, in a patient with Hashimoto's struma, a myxedematous condition was about to develop. The destruction of glandular tissue had been so profound that hormone production had not been adequate. The remaining functioning tissue had presumably worked with maximum speed and been strongly stimulated by thyrotropin, as shown by the increased PBI^{131}.

Histologically, Hashimoto's struma is characterized by the supplanting of the normal thyroid tissue by lymphoid follicles with prominent germ centers; there is also diffuse infiltration of plasma cells with fibrosis. The affection starts with gradual enlargement of the thyroid gland. In many cases there are beginning symptoms of hypothyreosis. The sedimentation reaction is always increased. A positive precipitin test is of great diagnostic value, but the test is not specific for lymphoid struma and is positive in some cases of thyroid carcinoma. A constant and significant finding in Hashimoto's struma is that stimulation with thyrotropic hormone does not lead to increased absorption of I^{131} in the gland. In cancer of the thyroid there will, as a rule, be increased absorption of I^{131} after TSH. In thyroiditis there is often increased PBI^{127} but only insignificant absorption of I^{131} in the thyroid gland. In Hashimoto's disease the PBI^{127} is low and the PBI^{131} high.

Milkborne Streptococcal Sore Throat: A Study of 835 Cases. P. J. Taylor and M. A. McDonald. Lancet 1:330-333 (Feb. 14) 1959 [London].

In 3 similar epidemics at Akrotiri, a large Royal Air Force station in Cyprus, in the summer of 1957, 835 patients with tonsillitis or pharyngitis were admitted to hospital. The 3 waves began on May 12, May 26, and Aug. 3, and all showed the explosive start suggesting a food-borne infection. All patients were living-in airmen eating in one mess. Breakfasts were the only meals which all the patients had attended, and milk in tea or on cereals was the only common food. By the third epidemic it was realized that the 3 outbreaks had appeared during the weekends after the fortnightly pay parades. All milk consumed at Akrotiri was tinned milk diluted with water. The kitchen regulations stipulated that milk should not be prepared until just before breakfast at 5:30 a. m. and that it should be kept in covered containers. But 2 cooks admitted that on these fortnightly pay nights, because of pressure of work later in the night, they often made up the milk at midnight and that it was often sampled thereafter. The mess staff had their throats swabbed on May 14, and this yielded 12 positive cultures of group A streptococci out of 64 persons. These findings seem compatible with milk being the vehicle of infection.

The illnesses began abruptly with malaise or sore throat, and almost all patients were admitted within 24 hours. Considerable injection of the throat was the rule, with a variable amount of edema, and purulent exudates were seen in all with intact tonsils. Tender cervical lymph nodes were also present. The characteristic punctate erythema of scarlatina, usually only moderate in severity, was observed in 120 of the 835 patients. Of the 751 patients whose throats were swabbed on admission, 432 were found to carry group A Streptococcus pyogenes. All 12 representative subcultures from the first 2 waves sent to the Streptococcic Reference Laboratory belong to Griffiths type 5/12/27, while the 7 subcultures from the third epidemic were found to belong to either Lancefield group A or group G.

While it was not possible to compare the results of the different methods of treatment in all outbreaks, some assessment could be made of the effect of previous tonsillectomy; the results suggest that the operation is associated with a lowered susceptibity to infection, but once the illness is established, the individuals fare no better than their intact brethren, as judged by the height and duration of fever. Bacteriologically, however, there is a difference between the 2 groups, since more patients with intact tonsils had positive throat cultures than those without tonsils. In all 3 waves 19.6% of patients had a positive throat swab when they had recovered clinically. The breakdown of the carrier rate reveals noteworthy differences: penicillin (99 cases) carrier rate, 1%; Sulfatriad (336), 14%; aspirin (383), 24%. The final carrier rate two weeks after discharge from hospital for all patients was 4.7%.

Food-borne epidemics of streptococcic tonsillitis differ from the more common air-borne outbreaks by their abrupt onset, sudden termination, and low complication rate. It has been suggested that these characteristics are produced by a massive infection with a relatively avirulent organism.

Coexisting Primary Lung Carcinoma and Pulmonary Tuberculosis: A Report of Fifteen Cases Discovered Through a Chest Clinic and Hospital.

F. C. White, F. Beck and D. V. Pecora. Am. Rev. Tuberc. 79:134-141 (Feb.) 1959 [New York].

Fifteen men, between the ages of 42 and gh
years, in whom pulmonary tuberculosis coe sev-
with carcinoma of the lung, were observed This
Ray Brook State Tuberculosis Hospital i ll the
Brook, N. Y. All the patients had smok
adolescence, and 5 had consumed mo a com-
cigarettes daily for many years. T crocythemia
the tuberculosis, according to the their relativ
ards of the National Tuberculosis Association, was minimal in 4 of the 15 patients, moderately advanced in 6, and far-advanced in 4. Neoplastic and tuberculous diseases were so intermixed in one patient that the extent of the tuberculous disease could not be determined. The site of the origin of the primary carcinoma was ascertained in 14 of the 15 patients. The right upper lobe bronchus was involved in 8 patients; the right lower lobe in 1, the left upper lobe in 1, the left lower lobe in 3, and the left main bronchus in 1. A review of serial chest roentgenograms and pathological data revealed that in 7 patients the carcinoma arose in an area in which no evidence of previous tuberculosis was apparent. Carcinoma and tuberculosis occupied the same general area in the lung in 6 patients. Carcinoma was diagnosed in one patient with a negative tuberculin reaction; subsequently, the tuberculin reaction became positive, and tubercle bacilli were found in the sputum. The primary site of origin of a diffuse alveolar-cell carcinoma was not found in the remaining patient.

In 7 patients the earliest roentgenographic evidence of primary carcinoma of the lung appeared as a circumscribed nodular homogeneous shadow in the middle lung zone in the region of the second or third bronchial division. Unilateral enlargement of the hilus was the presenting roentgenographic sign in 3 patients and was associated with relative airlessness of a segment of the lung in 2 of these. The first abnormality in the chest roentgenogram of one patient was a spontaneous pneumothorax with an 80% collapse of the lung. Increased radiopacity of a portion of the lung due to relative airlessness without hilar enlargement was seen initially in 2 patients. In the remaining 2 patients carcinoma was not recognized roentgenographically even in retrospect. In most patients the shadows in the chest roentgenogram, which in retrospect were found to be due to carcinoma, increased in size rapidly over a period of sever months. In one patient, however, the
chan erature took place gradually over a numb
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ood-sugar-raising hormon roentg rease in the
depth and duration of the hypoglycemic state intensifies the stimulus on the secretory activity of the adrenal-pituitary system; as a consequence the action of the blood-sugar-raising hormones can cancel out the action of injected insulin and tip the balance in favor of the former. The result is a sharp rise in the glycemic level, despite the presence of active insulin, and exorbitant hyperglycemia and glycosuria after alimentation in this condition. When hyperglycemia due to excess insulin action is countered by administration of in-
d doses of insulin, under the assumption that
lycemia can only result from a deficient in-

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[illegible] the entity of "farmer's [illegible] fenisecarum. This ap- [illegible] condition in areas, such [illegible] Valley of Nova Scotia, where so [illegible] farmers, raising cattle, working [illegible] sometimes moldy hay, or thresh- [illegible] like most fungous diseases, the in- [illegible] does not appear to invade the lung. [illegible] clinical features of farmer's lung is its [illegible] nature. Its onset is usually acute, and [illegible] may be quite ill with severe dyspnea but [illegible] without bronchospasm. The patients have [illegible] fever, and the blood sedimentation rate may be increased. There is frequently marked cough but very scanty sputum. Exacerbations occur on further contact with the source of the causative organism, but once the patient is removed from contact with the grain and its contaminating spores, improvement is rapid. Rarely does the disease progress to the development of cyanosis or emaciation, but these can occur, and the outcome can be fatal. The roentgenologic picture may simulate miliary tuberculosis or other diseases causing disseminated fine nodular or fibrous shadows in both lungs, which render the diagnosis difficult. These manifestations of allergic origin are based on a hypersensitivity to spores which are found in moldy hay or grain. It is, therefore, suggested that some acute pulmonary illnesses which occur in farmers may on occasion be due to a mold spore pneumoconiosis or farmer's lung.

Treatment of Autoimmune Hemolytic Anemia with Prednisone: Clinical and Serologic Findings. M. Martelli, R. Martinez and F. Caronia. Riforma med. 73:128-133 (Jan. 31) 1959 (In Itali[illegible] Naples].

Thyroi[illegible]itial intensive treatment [illegible]matosa (Has[illegible]ne, moto). L. [illegible]f a monthly do[illegible] læger 121:129-[illegible] (Jan. 22) 1959 (Gm., [illegible]n) [Copenhagen].

Some of the less common thyroid affections, including light cases of acute, nonsuppurative thyroiditis and particularly lymphomatous struma,

tion of previously inffective blood transfusion produced hematological and general improvement in this patient. This management was continued in some degree after the patient's discharge.

Serologic investigations of the 6 patients revealed dissimilar and delayed responses. The direct Coombs test became negative in 4 patients; in 2 of them it was accompanied by diminution in the titer of serum agglutinins. The titer of serum antibodies diminished significantly in one patient with a persistent positive response to the direct Coombs test. The patients were followed up and were found to be well for a period of 12 to 20 months after discharge. Prednisone has thus been demonstrated to exert a beneficial, but not curative, action in patients with autoimmune hemolytic anemia.

Thrombophlebitis of the Superficial and Deep Veins Treated with Phenylbutazone (Butazolidin). E. J. Orbach. J. Internat. Coll. Surgeons 31:165-168 (Feb.) 1959 [Chicago].

The treatment of thrombophlebitis has been greatly influenced not only by anticoagulant therapy but also by the observation in 1954, by Swiss and American authors, that the perivascular inflammation associated with acute superficial thrombophlebitis could be rapidly resolved by the use of the anti-inflammatory agent, phenylbutazone. Since then a number of investigators have confirmed the impression that phenylbutazone is an extremely effective agent in treating thrombophlebitis. The studies presented here aimed to ascertain the value of the use of phenylbutazone, together with early ambulation and consistent use of compression bandages, in the treatment of thrombophlebitis affecting either superficial or deep veins. Twenty-two patients with acute thrombophlebitis were selected for treatment with phenylbutazone. In 12 of the patients the disorder affected only superficial veins of the leg or thigh; deep veins were affected in the other 10, with superficial veins also involved in 1 case. The patients ranged in age from 33 to 78 years, most of them being between 50 and 70. Although none had a history of previous embolism, several had had episodes of thrombophlebitis. Symptoms of the current disorder had been present for less than [illegible] weeks before phenylbutazone therapy was ini[illegible]ted. The phlebitis occurred postoperatively in
Th[illegible]tients, after injection of sclerosing agents in 4,
not [illegible] mechanical trauma in 1 (diabetic) patient,
5:30 a[illegible]as of obscure origin or associated with
contain[illegible]ities in the rest.
fortnig[illegible]ylbutazone was administered orally to 16
later in [illegible]nd intramuscularly to 6. The usual oral
at midnight [illegible] mg. daily, given in divided doses,
after. The me[illegible] days. When administration was
on May 14, and [illegible]hat time, the dose was fre-

quently reduced to 200 mg. daily. Oral phenylbutazone therapy was never continued longer than a week, and the total amount administered did not exceed 2.1 Gm. Used intramuscularly, a single injection of 600 mg. of phenylbutazone was generally sufficient, since the drug is absorbed slowly from intramuscular depots. Compression bandages were used to reduce the initial edema and to prevent further swelling, and early ambulation was encouraged. In several cases of superficial thrombophlebitis the vein was incised and the clotted or stagnated blood removed. Because patients in this study were to be given phenylbutazone for no longer than one week, hematological studies were not considered essential.

Signs of acute inflammation subsided rapidly. A second course of phenylbutazone was successful in one of 2 patients in whom the phlebitis recurred. In the other patient a second course was not attempted. No toxic or other undesirable effects from phenylbutazone therapy were observed in any of the patients, and the author believes that this agent will prove helpful in the management of thrombophlebitis involving either superficial or deep veins.

Further Observations on the Clinical, Morphologic, Hematochemical and Electrophoretic Aspects of Microdrepanocytic Disease. R. G. de Benedetti, F. di Tullio and P. Strigini. *Haematologica* 43: 1109-1122 (no. 11) 1958 (In Italian) [Pavia, Italy].

Microdrepanocytic anemia was discovered in 2 brothers; one was 2 years and 5 months old, and the other was 5 years and 6 months old. Blood tests were given to the whole family of the patients, and microcythemia and sickle-cell anemia were found as hereditary diseases. Three of the 4 great-grandparents of the children were of Sicilian origin; the family belonged to blood group B. Microcythemia, which was found in the father and in the elder brother of the 2 aforementioned patients, was characterized by a reduced volume and diameter of the erythrocytes and by an increase in the A_2 fraction in electrophoresis. Sickle-cell anemia, which was found in the mother and in a maternal uncle of the 2 children, was evidenced by the separation of the hemoglobin S band in the electrophoresis and by the "sickling" phenomenon. The "sickling" phenomenon was discovered by making tests on fresh blood and by provoking anoxia in vivo. For the latter test a current of carbon dioxide was bubbled through the blood, and then the blood was stored for several hours in a humid chamber at 37 C. This latter test showed "sickling" in practically all the elements.

The 2 children reported on presented a combination of the symptoms of both microcythemia and sickle-cell anemia present in their relatives plus abdominal pain. In one child a slight swelling appeared on the dorsum of the hand, but he had no fever, and the authors believe that the swelling was caused by changes in the circulation of the sickle-shaped erythrocytes. In the other child the liver was found to be enlarged and painful; bilirubinemia was high; the child was rather pale in color; and jaundice was present in the scleras.

Exacerbation of Diabetes by Excess Insulin Action. M. Somogyi. Am. J. Med. 26:169-191 (Feb.) 1959 [New York].

Detailed laboratory data, gathered in closely controlled observations and experiments on 4 men, between the ages of 23 and 36 years, and a 24-year-old woman with severe diabetes, revealed complete lack of parallelism between the amount of insulin injected and the amount of carbohydrates utilized; even when both diet and insulin dosage were kept constant, glycosuria varied over wide ranges, and the blood sugar oscillated between very low and very high levels. The laboratory records of patients who were treated with substantial doses of insulin revealed a consistent pattern of periodic ebb and tide in the fluctuations of both the glycosuria and the glycemic level, and disclosed the fact that the high tides consistently occurred in the wake of hypoglycemic reactions, even after asymptomatic, mild degrees of hypoglycemia. Thus, a clear-cut cause-and-effect relationship unfolds itself between hypoglycemia and the ensuing upsurge of hyperglycemia, and one is confronted with the paradoxical fact that excess insulin action can produce hyperglycemia. It can be stated that, barring other physiological and emotional stresses, conspicuous fluctuations in glycosuria are unmistakable indicators of excess insulin action.

The impairment of carbohydrate tolerance as a sequel of hypoglycemia is readily explained on the basis of experimental evidence available in the literature and supplemented by studies in the author's laboratory, which show that hypoglycemia elicits an accelerated release of adrenal-pituitary blood-sugar-raising hormones. Increase in the depth and duration of the hypoglycemic state intensifies the stimulus on the secretory activity of the adrenal-pituitary system; as a consequence the action of the blood-sugar-raising hormones can cancel out the action of injected insulin and tip the balance in favor of the former. The result is a sharp rise in the glycemic level, despite the presence of active insulin, and exorbitant hyperglycemia and glycosuria after alimentation in this condition. When hyperglycemia due to excess insulin action is countered by administration of increased doses of insulin, under the assumption that hyperglycemia can only result from a deficient insulin supply, the result is exacerbation of the diabetic syndrome, manifested in extreme fluctuations of glycosuria, with mounting peaks and ketonuria; at the same time, recurrent hypoglycemic reactions increase in severity.

It is evident that in insulin therapy avoidance of hypoglycemia, even of mild, asymptomatic degrees, is no less important than the control of excessive hyperglycemia and glycosuria. Application of this precept makes it possible to forestall the development of severe states of diabetes, and to restore patients with severe diabetes to a status of mild diabetes that can be satisfactorily managed with small doses of insulin or, not infrequently, without insulin. One should adjust the insulin dosage and diet not so much to abolish glycosuria but to achieve maximal glucose utilization per unit of insulin administered. This can often be achieved, even in the "unmanageable" patients, by slow reduction in insulin dosage, with proper distribution in relation to the adjusted diet.

The Problem of the Intrahepatic White Bile. M. L. Leger, P. Rambert, J. Canivet and others. Presse méd. 67:168-171 (Jan. 28) 1959 (In French) [Paris].

In addition to the known occasional occurrence of white bile in the common bile duct, there are also cases in which white bile has been found within the liver, which poses a much more complex physiopathological problem. Four patients are presented in whom the white bile within the liver was demonstrated by means of transparietal hepatic puncture and insertion of a Polythene tube at the site of the needle. All the patients had obstructive jaundice of from 50 days' to 3 months' duration, due to a cancerous tumor on the head of the pancreas. A more detailed description is given of a 5th patient who had severe retention jaundice of 10 months' duration due to complete obstruction of the biliary ducts by alveolar echinococcosis of the liver. Cholangiography revealed greatly dilated intrahepatic ducts in all the patients. It was interesting that bile flow and bile pigment were rapidly restored after drainage. The initially white bile of the 5th patient was rapidly followed by darker bile, and, within 15 hours after drainage had begun, the bilirubin content was far above normal. These facts suggest that the intrahepatic white bile cannot be attributed to a parenchymatous functional disorder of bile formation, but rather to an excretory mechanical disorder, although the hepatic cells were affected.

Acholia, as the word is used by the authors, was not manifested by these patients, because biligenesis existed; the secretory activity that produces bile was present; the drainage of the intrahepatic ducts alone was sufficient to permit excretion of bile with normal bilirubin and cholesterol levels. The significant physiological role of Disse's spaces in this phenomenon is stressed. In opposition to the generally accepted view, the authors do not believe that the presence of white bile necessarily implies an unfavorable prognosis. It is rather the frequently malignant nature of the obstruction, inhibiting the excretion of bile, which is responsible for the fatal outcome.

The Time of Appearance of Bromsulphalein (BST) in the Bile: Observations in the Diseases of the Biliary Tract. J. Latvalahti and O. Alfthan. Ann. med. int. Fenniae 47:175-182 (no. 4) 1958 (In English) [Helsinki].

The authors performed the Bromsulphalein test on 88 patients, by means of duodenal intubation, to determine the time of appearance of Bromsulphalein (BST) in the bile. Of the 88 patients, 21 were chosen as a contra test group; no clinical symptoms or laboratory tests pointed to bile or liver disease in these patients. All these contratest patients showed a normal Bromsulphalein retention in the blood, and the BST values obtained ranged from 15 to 25 minutes. Of the 67 selected patients with various hepatobiliary diseases, 17 presented a BST of 25 minutes or less. Protracted times were observed in the remaining 50 patients. Among the 50 patients, no mechanical reason for the lengthened BST was discovered in 27 who had hepatobiliary diseases. The anatomic reason for the protracted BST in 13 patients was choledocholithiasis; in 5, obstructive biliary carcinoma; in 4, biliary cirrhosis; and in 1, ductus cysticus remanens. The determination of the BST seems to be serviceable as an additional examination in diseases of the biliary tract. The test is easy to perform. Although the simple finding of a lengthened BST must be treated with reserve if there is nothing else indicative of biliary disease, it may be emphasized that protracted times were not observed in patients who had no hepatobiliary diseases. A shortened BST, though, does not exclude with certainty a relative obstruction in the biliary system.

SURGERY

Traumatic Rupture of the Normal Spleen. W. W. Francis and J. Benavides. Rhode Island M. J. 42:102-104 (Feb.) 1959 [Providence].

Thirty patients with traumatic rupture of the normal spleen were admitted to the Rhode Island Hospital, Providence, during the period from January, 1946, to August, 1958. Seventeen of the patients were less than 20 years of age; 22 were male and 8 female. Only 6 of the patients sustained their injury in automobile accidents. Twenty-eight of the patients had nonpenetrating and 2 had penetrating traumas. Rupture occurring within 48 hours after the injury is arbitrarily defined as primary; if it occurs later, it is called the delayed type. In this series, 5 ruptures were of the delayed type. Eighteen patients had associated injuries; rib fractures, the commonest, were present in 6 patients. Renal injuries existed in 3 patients, a lower incidence than in other reports on splenic rupture.

Abdominal pain associated with tenderness and spasm involving primarily the left upper quadrant was present in a high percentage of the cases in this series. Sixteen patients complained of shoulder pain, while 22 patients showed some evidence of shock. In only one patient was a mass palpable. A high percentage of the patients had a white blood cell count over 10,000. Eight patients showed roentgenologic signs suggestive of ruptured spleen, such as elevation of the left leaf of the diaphragm, obliteration of the splenic shadow with serration of the greater curvature of the stomach, or left upper quadrant mass with or without displacement of abdominal organs. Diagnostic peritoneal taps were done in 5 of the patients and yielded blood in 3. The authors present the history of a patient in whom diagnostic peritoneal tapping clarified an obscure picture and allowed immediate, lifesaving surgery. The technique of this procedure is described.

There is little doubt that splenectomy is the treatment of choice for rupture of the spleen. This is borne out in this series by the fact that the only 2 deaths occurred in patients not operated on. Of the 28 patients treated surgically, 25 had splenectomies, and 3 merely had repair of the splenic injury. Although these 3 patients recovered, this procedure is not recommended. Thirteen of the operations were carried out through left-sided rectus incisions, while 11 were done through subcostal incisions. Various incisions were used in the other 4 cases.

Operative Technique in Funnel Chest: Experience in 81 Cases. V. Paltia, K. V. Parkkulainen, M. Sulamaa and G. R. Wallgren. Acta chir. scandinav. 116:90-98 (no. 2) 1958-1959 (In English) [Stockholm].

After citing a number of surgical techniques suggested by others for funnel chest, the authors say that since 1951 they treated a total of 81 patients for funnel chest. In the first 11 of these patients they applied a modification of Ravitch's or Wahren's technique. Postoperative stabilization of the sternum was by no means satisfactory in all cases, and respiration produced paradoxical motion on either side of the totally freed sternum.

The remaining 70 patients have been operated on since 1954 according to the authors' own method, the main features of which were transverse incision, freeing of the origin of the pectoral muscles, subperichondral resection of the deformed costal cartilages, division of the xiphisternal joint, stripping of the posterior surface of the sternum, and stabilization by means of a metal strut introduced through the sternum with its ends resting upon the costal stumps. The strut was removed after 3 months. There were no deaths. Complications were pneumothorax in 11 and wound infection in 7 of the 70 patients. Clinically the result, as estimated either at the removal of the strut or later, was considered good or satisfactory in more than 90% of the cases. Cosmetically the result was considered good in 51 cases, satisfactory in 10, and poor in 2. In the cases with a poor cosmetic result the strut had been removed 30 and 40 days, respectively, after operation because it had shifted. There were altogether 10 cases in which the strut was removed earlier because it had shifted. The authors stress the simplicity of their method, its freedom from risk, and the good results obtained.

Controlled Studies on the Efficacy of Bilateral Internal Mammary Artery Ligation in Patients with Angina Pectoris. R. E. Fremont, R. Klopstock and P. Glass. Angiology 10:20-27 (Feb.) 1959 [Baltimore].

Eight patients, between the ages of 32 and 66 years, who had severe coronary artery disease associated with distressing attacks of anginal pain and who failed to respond to medical therapy, underwent ligation of both internal mammary arteries in the second intercostal space (B. I. M. A. L.). In 4 additional patients, between the ages of 33 and 39 years, with angina pectoris, a sham procedure and serial exercise electrocardiogram and ballistocardiogram tests were performed. The sham procedure consisted of bilateral skin incisions, the localization of the internal mammary arteries, and the encirclement of these vessels by loose ligation. This sham operation was followed by the actual B. I. M. A. L. in 3 patients after 2 to 6 weeks. The latter operation was omitted in the 4th patient because he sustained in the interval period a mild myocardial infarction.

Two of the group of 8 patients died, one 4 hours after the well-tolerated operation and the other 11 days after the operation. The 6 surviving patients showed prompt symptomatic relief of variable duration, which ranged from 1 week to 4 months. In none of these patients was there any improvement of the rest electrocardiograms or ballistocardiograms. Of the 3 patients who underwent both sham procedures and B. I. M. A. L., one noted prompt relief after the sham procedure, with reduction of the daily need of glyceryl trinitrate; 6 weeks later his use of glyceryl trinitrate tablets had increased again, and after the actual B. I. M. A. L. there was again prompt relief for about 10 days, but within 2 months he was again using 10 tablets of glyceryl trinitrate and again had occasional decubital anginal pain. The 2 other patients in this group failed to show any objective and subjective improvement after the sham procedure; they obtained subjective improvement after the B. I. M. A. L. lasting 8 to 10 months.

The results of these pilot studies revealed numerous pitfalls in the evaluation of patients before and after surgical treatment both as regards symptoms and, to a less extent, objective tests. B. I. M. A. L., like all other types of coronary surgery, has a considerable psychological component which is responsible for rapid subjective improvement in most patients, regardless of the severity of the disease. Prolonged subjective improvement was noted only in those patients who had a mild form of the disease. Objective improvement, as manifested by improved or normalized electrocardiographic response to exercise, is similarly limited to patients with the mildest forms of the disease. The use of the B. I. M. A. L. for the treatment of coronary disease requires further careful study based on a large number of patients and employing objective data. These should include sham procedures and exercise electrocardiography.

Short-Term and Long-Term Follow-up of Unoperated Patients with Certain Varieties of Acute Abdominal Diseases During the Past Decade: Patients from 60 to 85 Years of Age and Those Under 60. C. Parenti. Chir. ital. 10:622-647 (no. 6) 1958 (In Italian) [Milan, Italy].

A follow-up study was carried out by calling on 137 patients at home shortly, or at a longer interval, after their discharge from the hospital. All were patients who had certain varieties of acute abdominal diseases, but who had not undergone surgery either because they were poor risks or because they objected to surgery. Home visits enabled the author to distinguish deaths attributed directly to the previous acute abdominal disease from those related to other causes. The patients were divided into 2 groups; the older group included 109 persons between 60 and 85 years of age, and the younger group included 28 persons below 60.

Cholecystitis was present in 23 patients of the older group and in 11 patients of the younger group; acute cholecystitis associated with peritonitis, in 18 older patients and in 4 younger patients; acute appendicitis, in 14 older patients and in 1 younger patient; acute appendicitis associated with diffuse peritonitis, in 16 older patients; appendical abscess, in 35 older patients and in 9 younger patients; pelvic peritonitis, in 2 older patients and in 1 younger patient; sigmoiditis, in 1 older patient; and pancreatitis, in 2 younger patients. Patients with acute appendicitis associated with diffuse peritonitis, below 60 years of age, were operated on and, therefore, excluded from this investigation. Of the older group, 7 patients (43%) died of acute appendicitis associated with diffuse peritonitis, and 5 patients (14%) died of appendical abscess. No deaths took place among patients of the younger group.

This study discloses that a considerable decrease in deaths attributed to certain varieties of acute abdominal diseases has taken place during the past decade when antibiotics have been used. It also is interpreted to mean that emergency operation for acute cholecystitis is no longer justifiable.

Behavior of the Serum Glutamic Oxalacetic Transaminease (Aminopherase) Level in Relation to Surgical Operations. C. Andres. Chir. ital. 10:654-662 (no. 6) 1958 (In Italian) [Milan, Italy].

Values of serum glutamic oxalacetic transaminase (SGO-T) were recorded for about 50 patients before and after operation to investigate the relationship between surgical trauma and cellular metabolism. The ages of the patients ranged from 16 to 66 years. Four patients were operated on for inguinal hernia; 6, for chronic, subacute, or acute appendicitis; 13, for duodenal or gastric ulcer; 5, for gastric carcinoma; 7, for cholecystitis; and the remainder, for other disorders. The levels of SGO-T rose postoperatively in all instances, regardless of whether they had been within or above the physiological limits before the operation. The highest values were observed immediately after the operation; they were reduced to one-half or one-third in 24 hours, and were restored to normal levels within 2 or 3 days after the operation. There were no significant differences in these values when the operations were performed with the patients under either general or local anesthesia. The levels were higher in more traumatic and prolonged operations. The author concludes that there exists a certain relationship between the increased values of SGO-T and the postoperative shock. This investigation may not as yet have a practical application; in particular, it has no diagnostic value when undertaken within the immediate postoperative period.

Treatment of Paralysis of the Flexors of the Elbow. A. Segal, H. J. Seddon and D. M. Brooks. J. Bone & Joint Surg. 41B:44-50 (Feb.) 1959 [London].

This paper presents the results of operations carried out to restore active flexion of the elbow. Four operations were employed: (1) transplantation of the pectoralis major into biceps (*a*) according to Clark's (1946) method and (*b*) according to the Brooks-Seddon (1959) method; (2) transplantation of triceps into biceps; and (3) proximal transplantation of the common flexor and extensor origins—Steindler's operation. The authors studied 41 patients who had lost active elbow flexion, either from a traction lesion of the brachial plexus (20 patients) or after an attack of poliomyelitis (21 patients). The average period of postoperative observation was 4 years and 8 months, the shortest period being

10 months and the longest 11 years. Clark's transplantation was carried out in 17 patients, the Brooks-Seddon transplantation in 8, Steindler's transplantation in 13, and triceps transplantation in 3 patients. The results were graded objectively and subjectively.

As regards the objective results, Steindler's transplantation gave the best results, followed closely by Clark's pectoral transplantation, the other 2 types of transplantation being less satisfactory. However, because each method of operation has certain advantages and disadvantages, the results are further analyzed with regard to (1) the passive movement of the elbow, (2) active and passive supination, and (3) associated movements. The results were better when the extension of the elbow was limited; such limitation always occurs after Steindler's operation, but infrequently after pectoral transplantation.

The results of pectoral transplantation are good when there is no significant shoulder paralysis; if there is shoulder weakness, arthrodesis of the joint may be required to control medial rotation and adduction of the shoulder on flexion of the elbow. In brachial plexus lesions the results of pectoral transplantation may be marred by simultaneous contraction of the triceps. This can be overcome by transplanting triceps into the flexor apparatus. Triceps transplantation is rarely indicated because loss of active extension of the elbow is a grave disability.

Subjective results tended to be worse than objective results in brachial plexus lesions, because impairment of sensibility in the hand often limited the usefulness of the limb. In striking contrast the subjective results were, in general, far better than the objective in patients who had had poliomyelitis. In them the smallest gain can be of functional value.

Clinical Use of Vasectomy for Sterilization. B. B. Ohri and P. S. Jhaver. Indian J. Surg. 20:480-484 (Dec.) 1958 [Madras].

Five hundred forty-two vasectomies were performed on men, between the ages of 25 and 60 years, at the Medical College Hospital in Indore, India, between 1954 and 1957. Most of the men requested sterilization because they already had families of 4 to 17 children. Some of the men expected rejuvenation in addition. The first 50 patients were operated on by the standard two-incision technique with the aid of local anesthesia. In the other patients vasectomy was carried out through one central scrotal incision with an anteromedial approach to the vas deferens; this technique causes less pain, and only one small incision is required. Three hundred seventy-six patients were followed up by questionnaire to assess the clinical effects of the operation. Of the 376, 86 did not reply to the questionnaire, 278 were satisfied with the obtained results, and 12 were not. Six men complained of diminution of sexual capacity, 86 reported an increased sexual strength and desire, while 198 maintained that their sexual capacity remained as before. They were assured that their sexual capacity would not diminish but might increase.

Most of the patients obtained physical and sexual improvement and a great mental relief from the anxiety of further additions to the family. Bad effects reported were never due to the operation itself, but resulted from technical errors, namely, sepsis, injury to the blood vessels and nerves of the spermatic cord, or accidental cutting of structures other than the vas deferens. Vasectomy by a single scrotal incision is to be considered an ideal and safe procedure for control of conception and other purposes; it has no untoward effects on the physical, mental, and sexual faculties. Psychologically unstable men and those prejudiced to the operation should be advised not to undergo vasectomy.

Experiments on young rats, which were subjected to vasectomy and on which orchidectomy was performed within 2 weeks to 6 months after the first operation, revealed that vasectomy was followed by degeneration of the seminiferous tubules, but this degeneration was either incomplete or temporary. After vasectomy there was proliferation of the interstitial tissue of the testes.

The Short Leg in Poliomyelitis. A. H. C. Ratliff. J. Bone & Joint Surg. 41B:56-69 (Feb.) 1959 [London].

The author studied limb shortening after poliomyelitis in 225 children in whom paralysis was confined to one leg. The paralyzed leg became shorter than its fellow in 219 patients (97%). The discrepancy in leg length only once exceeded 3¼ in. Both the tibia and the femur were shorter than their fellows in 171 out of 184 patients studied (93%). In only one patient was the femur alone shortened. Three patterns were revealed in the progress of shortening; the progress was classified as rapid, when the discrepancy amounted to 2½ in. or more within 9 years or less of the onset of the disease; as slowly progressive, when the discrepancy increased slowly year by year, and amounted to 2 or 3 in. by the time the patient reached adult life; and as nonprogressive, when a discrepancy of up to 1½ in. was present 5 years after the onset of the disease, then remained constant until growth ceased. There was no evidence that a reduction in shortening ever occurs.

It proved impossible to predict the degree of shortening accurately. While, in general, it could be said that, the severer the paralysis, the greater the shortening, there were notable exceptions to this rule. No relationship could be found between the amount of shortening and the incidence of paralysis in any individual muscle group. There was no significant difference in leg shortening between those patients in whom the poliomyelitis had developed during the first 2 years of life and those in whom it had developed later. A cold, blue limb was not more likely to undergo severe shortening than one not so impaired. When paralysis was confined below the knee, shortening never exceeded 1¾ in.; when, however, muscles both below and above the knee were paralyzed, then shortening amounted to as much as 3½ in. The cause of leg shortening is unknown. Premature epiphysial fusion was observed in only 2 patients in this series.

Few references are to be found on the occurrence of increased growth in a leg paralyzed by poliomyelitis. In this study 7 patients with true lengthening were encountered. The discrepancy in all 7 was mild, being ¼ to ½ in. Six of these 7 patients had suffered a severe paralysis. Valgus deformity of the femoral neck sometimes occurs after poliomyelitis, and it was at first assumed that this might explain the increased length. Four of these patients, however, had femoral necks with only a mild degree of valgus deformity, and in only one could the lengthening be completely explained in this way. Four patients in whom the leg lengthening was detected during routine clinical examination had been treated on hip abduction splints. The significance of this observation, like the etiology of the lengthening itself, is obscure. The author concludes that lengthening of a paralyzed leg can occur during the first 2 years after the onset of the paralysis, but is always a temporary phase.

Treatment of Perforated Peptic Ulcer. C. A. Gherardi and F. Baldrati. J. Internat. Coll. Surgeons 31:154-160 (Feb.) 1959 [Chicago].

This report is based on observations on 181 patients with perforated peptic ulcers who were observed over the past 10 years; 13 (or about 7%) were women; the patients ranged in age from 14 to 84 years. Perforation was most frequent in the age group between 40 and 49 years, followed by those between 30 and 39 and 50 and 59. All but 6 of the patients were treated surgically. There were 20 deaths among the 175 patients operated on (11.4%). This rather high mortality rate was directly related to the length of time that elapsed between perforation and hospitalization and to the lack of adequate preoperative preparation, but the age factor also played a part. Simple closure of the perforation was the surgical method most frequently employed, and the authors regard this as the treatment of choice. Surgical therapy should be undertaken only after thorough preparation of the patient, and the immediate postoperative period should be planned with the same care and thoroughness.

Fifteen patients were subjected to an emergency subtotal gastrectomy. The authors believe that in the presence of large perforations, suspected neoplastic ulcers, bleeding ulcers, or pyloric stenosis, and provided that no more than 12 hours have elapsed since perforation, subtotal gastrectomy may be performed. Gastric aspiration and the administration of adequate amounts of fluids, electrolytes, and antibiotics are important in the preparation for operation. The postoperative treatment also must be carefully planned. Conservative treatment should be considered only when the patient can be kept under constant close observation and when there is no doubt that sealing off of the perforation is taking place. Surgical treatment shortens the course of the disease and prevents complications.

The Management of Venous Thrombosis and Pulmonary Embolism. W. F. Barker. Surgery 45:198-203 (Feb.) 1959 [St. Louis].

The author reports on 80 patients with deep venous thrombosis, 16 of whom also had a superficial saphenous thrombophlebitis, and 38 had pulmonary embolism during some part of their histories. Sixty-six of the 80 patients received anticoagulant therapy; 42 of the 66 were given heparin and 24 received bishydroxycoumarin (Dicumarol). There was a manifest recurrence of thrombophlebitis in 22 patients, 6 of whom had been given heparin, 11 Dicumarol, and 5 had not received anticoagulant therapy. In 6 patients the recurrence appeared while they received adequate anticoagulant therapy in the hospital (5 receiving Dicumarol and 1 heparin). In 11 patients recurrences appeared after intervals ranging from 2 days to 6 months after cessation of treatment of previous thrombophlebitic activity. Of the 38 patients with pulmonary embolism, 10 were not treated with anticoagulants, and all of them died. Twenty-eight were treated with anticoagulants; in only 6 of these was there no recurrence of embolism either while receiving anticoagulant therapy or after cessation of this therapy. Fatal pulmonary embolism occurred in 9 patients, 8 of whom were treated with heparin and 1 with Dicumarol. Ligation of major veins at a sufficiently high level was performed in 16 patients in an attempt to forestall anticipated pulmonary embolism; the vena cava was ligated in 4, the iliac vein in 3, and the femoral vein in 9 patients; the ligation was successful in 13 patients, but failed to prevent pulmonary embolism in 3 of the 9 patients with ligation of the femoral vein.

These data indicate a serious failure rate in the form of either recurrent venous thrombosis or of originally occurrent or recurrent pulmonary embolism in patients treated with anticoagulants. Heparin seemed to be more effective than Dicumarol in relieving the symptoms of venous thrombosis, but it was associated with a considerable number of fatal pulmonary embolisms in the presence of what appeared to be adequate therapy. Venous ligation, especially at the level of the vena cava, when tolerable by the patient and when supplemented by postoperative anticoagulant therapy, seemed to offer the safest course with minimal morbidity.

Twenty-five Years of Progress (III): Progress in Gallbladder and Biliary Tract Disease. W. H. Cole and W. Harridge. Am. J. Digest. Dis. 4:93-116 (Feb.) 1959 [New York].

For the past 2 or 3 decades, evidence has been accumulating indicating that cholecystitis is primarily an inflammation of chemical origin and that infection is superimposed on the inflammation. It has been shown that a change in the ratio of cholesterol to fatty acids or bile acids by absorption of the bile salts through the gallbladder wall is very important in the causation of gallstones, particularly the cholesterol type. Iodoalphionic acid (Priodax) and iodopanoic acid (Telepaque), administered orally, proved to be highly effective for visualizing the gallbladder on roentgenographic examination. Operative cholangiography has been useful in the discovery of stones in the common bile duct. Cholangiograms taken 2 weeks after choledochostomy proved to be a valuable aid in making sure no stones have been left at the time of the operation. Since air bubbles are, at times, difficult to distinguish from stones, the occurrence of air bubbles may be prevented by introduction of a tiny plastic catheter, filled with iodopyracet (Diodrast), downward into the T-tube, as far as it will go. If iodopyracet or sodium chloride solution is then injected, the air in the T-tube will be forced out. Intravenous cholangiography with the use of iodipamide (Cholografin) sodium, the first roentgenogram being taken 15 minutes after completion of the injection of the contrast medium and another 5 minutes later, has a definite advantage over postoperative cholangiography since the latter may introduce air into the common duct.

Some surgeons favor nonoperative treatment during an acute attack of cholecystitis and surgical treatment later after the acute inflammatory process has subsided. There is general agreement that, if the patient with acute cholecystitis is seen within 48 hours after onset of symptoms and the diagnosis appears quite accurate, prompt operation is advisable. Free perforation of the gallbladder into the peritoneal cavity with resultant bile peritonitis is a serious complication, resulting in death unless the corrective operation is performed within a few hours after the perforation has occurred. Immediate operation is usually advisable because of the danger of perforation if signs of impending gangrene of the gallbladder develop. The authors agree with those surgeons who feel that there should be a life expectancy of at least 7 or 8 years before advising cholecystectomy for asymptomatic cholelithiasis. Most of the strictures of the common bile duct are caused by trauma during cholecystectomy. Since treatment of these strictures is complicated and often associated with failure, the most important phase of therapy lies in prevention of this complication.

In patients with gallstones and pain located in the left part of the precordium, removal of the gallbladder containing gallstones is definitely indicated if there are no electrocardiographic changes and if there is no history of a coronary attack. Usually cholecystectomy for gallstones will eradicate the pain in such patients. Cholecystectomy for gallstones also may be indicated if the pain is not related to exercise, even though the electrocardiographic tracings are suggestive of coronary disease. Occasionally cholecystectomy will be indicated in patients with cholelithiasis if the electrocardiogram shows evidence of myocardial damage, and pain is present on exercise, provided that the cardiac status is well stabilized and there have been no attacks of coronary involvement for the past 3 to 6 months.

If a patient has had a cholecystectomy and is having residual symptoms, the two most likely causes of these symptoms are stone in the common bile duct and fibrosis of the sphincter of Oddi. If the common duct is explored for stones and there is an obstruction at the terminal end, an attempt should be made to pass a probe or scoop, 5 mm. in diameter, through the sphincter into the duodenum. If the sphincter is fibrosed and will not allow passage of the scoop or probe, the sphincter should be severed. It is actually desirable to cut the sphincter in 2 places to prevent reunion of the edges with reformation of the fibrosis. A T-tube should be inserted in the common duct after sphincterotomy, but should be removed early.

In a 5-year study conducted by the authors between 1948 and 1952, a zero mortality rate was noted for 169 patients, aged less than 60 years, undergoing cholecystectomy for cholelithiasis, and one death was noted among 54 patients over 60 years of age. In patients who have typical right upper quadrant pain associated with gallbladder disease, removal of the gallbladder will result in elimination of the symptoms in 95% of the cases. If cholecystectomy were performed for atypical symptoms, consisting perhaps of eructation, belching, and other symptoms of dyspepsia, results will be good in not more than 50 to 60%.

Early Clinical Manifestations of Cancer of the Colon and Rectum: A Statistical Study. H. L. Bockus, M. H. Kalser, Y. Mouhran and others. Dis. Colon & Rectum 2:58-68 (Jan.-Feb.) 1959 [Philadelphia].

A large proportion of cancers of the colon and rectum are curable if removed soon after the appearance of first symptoms. The over-all cure rate of colonic carcinoma exceeds that of cancer at any other site in the alimentary canal. The authors studied the early clinical manifestations of colonic and rectal cancer by reviewing the records of 418 patients with proved cases seen at the Graduate Hospital of the University of Pennsylvania, Philadelphia, from 1936 to 1958. There were 139 patients (33%) with cancer of the rectum, 209 (50%) with cancer of the right colon, and 70 (17%) with cancer of the left colon. Lesions occurring in the sigmoid as well as those in the midtransverse colon and distal thereto (excluding the rectum) are included under the designation "left colon." Before considering the early manifestations, the authors point out that colonic and rectal cancers are sometimes preceded by antecedent or precursor lesions. Such lesions were observed in 41 (9.8%) of the 418 patients. There were 4 patients with ulcerative colitis, 20 with a single polyp, 6 with multiple colonic polyposis, and 11 patients who had been operated on previously for cancer of the colon.

Abdominal pain or discomfort, blood in the stools, and change in bowel habits were the most significant early symptoms. Pain was the commonest early symptom, particularly in colonic cancers; it was somewhat less frequent in rectal cancers, but it existed in 78% of the entire series of 418 cases. Change in bowel habits was the second most common symptom; it occurred in 71% of rectal, 69% of left colonic, and 54% of right colonic neoplasms; it was the commonest first symptom in rectal neoplasms and was present in 67% of the entire series of cases. The third important early symptom was passage of gross blood in the stools; this occurred in 80% of rectal, 49% of left colonic, and 30% of right colonic lesions; it closely followed "change in bowel habits" as a first symptom in rectal neoplasms (37%) and occurred as a first symptom in 26% of lesions in the left colon (including the sigmoid).

While symptoms such as intestinal obstruction, anemia, weight loss, symptoms of metastasis, and palpable mass usually occur later in the course of colonic and rectal cancers, any of these manifestations of advanced growth may at times constitute the first clinical feature of the disease. Intestinal obstruction, usually a symptom of moderately advanced disease, was considered to be the significant presenting complaint in 16% of left colonic lesions, and in 11% of the entire series of 418 cases. Anemia was noted in 24% of all neoplasms and in 53% of right colonic lesions. Weight loss exceeding 10 lb. (4.5 kg.) was noted in 38% of the patients. Symptoms caused by metastasis were observed in 7% of the patients on admission. A palpable mass was recorded in 37% of the patients with colonic carcinomas (excluding rectum); it was present in 29% of left colonic lesions and in 69% of right colonic neoplasms.

Delay in diagnosis of over 6 months was attributable to the patients in 23% of the cases and to physicians in 28%. The average length of the delay was practically the same regardless of the location of the neoplasm. The over-all length of the delay in diagnosis was less in the group of patients seen after 1951 than in the group seen between 1936 and 1950.

Total Reconstruction of the External Ear. R. C. Tanzer. Plast. & Reconstruct. Surg. 23:1-15 (Jan.) 1959 [Baltimore].

After citing the principal difficulties in producing an acceptable substitute for a missing ear, the author discusses 4 concepts, some new and some modifications of the views of others, that have been evolved to create a technique of reconstruction. He has applied these concepts successfully to the treatment of congenital microtia in 2 boys, aged 5 and 6 years respectively. 1. The ear is visualized as a structure composed essentially of 4 separate planes —conchal floor, conchal wall, antihelix-scapha complex, and helix. The antihelix-scapha complex is the key component of the reconstruction. If the antihelix and scapha can be properly formed and positioned, then the remaining 3 components can be developed as adjuncts to the principal structural block, either at the time of construction of the block or later. 2. In every method the surgeon has introduced the framework through an incision at some point on the head peripheral to the proposed site of the helix. The author feels that, and explains why, it is advantageous to implant the auricular cartilage through a central incision in the conchal region. 3. A complete unit reproducing the entire ear cartilage is not only unnecessary but undesirable, because it is too bulky and makes adequate coverage by skin difficult. An antihelix-scapha-helix unit is much more practical. The largest rib of a 5-year-old child is not large enough to allow the carving of this unit. However, 2 rib cartilages placed side by side yield sufficient width and depth to permit the fashioning of a normal adult-sized antihelix-scapha unit. With this key component completed, it is then possible to carve a helix from another rib, warp it, and wire it perpendicular to the edge of the scapha. 4. In the normal ear from one-third to one-half of the conchal cavity lies below the adjacent skin level; hence, the conchal floor can be simply constructed by removing tissue in the form of a flap from the concha, rolling it forward under itself to produce a tragus, and implanting a free graft in the conchal defect. The creation of the wall of the conchal cavity, lying in a plane at right angles to that of the conchal floor and of the antihelix, while at the same time bringing the ear out at a proper angle to the side of the head, offers one of the major barriers to successful ear reconstruction. The author finally decided that the simultaneous production of the auriculocephalic angle and the construction of the conchal wall were impractical and that the logical solution was to bring the antihelix-scapha-helix unit outward into proper position like a valise handle, leaving the conchal wall deficient and constructing it at a later time from adjacent retroauricular tissue.

The author illustrates his technique with diagrams. While he has used this technique in only 2 patients, it is applicable to several types of microtia and adaptable, at least in some measure, to partial or total traumatic loss of the auricle. The reconstruction, as outlined, can be safely completed in one year rather than the 20 and 21 months employed in the 2 patients. With further experience it may prove feasible to reduce the plan to 4 steps: rotation of auricle and implantation of cartilage, formation of the "valise handle" in 2 stages, closure of the tunnel, and formation of tragus and conchal floor, all of which could be accomplished in a period of about 8 months. The method of constructing the cartilage assembly from costal cartilage has been used in 4 other unfinished cases of various types, with gratifying results in each instance.

Automobile Accidents: The Multiple Injury Patient. E. R. Shipley. Maryland M. J. 8:52-54 (Feb.) 1959 [Baltimore].

This report is concerned with 178 patients requiring hospitalization on account of automobile accidents at South Baltimore General Hospital. The physician in the accident room may be confronted not only with more than one victim of an accident but also with victims having multiple injuries. There are 3 emergencies in which life or death may depend on seconds: respiratory insufficiency, hemorrhage, and cessation of heart action. If respiratory insufficiency threatens because of obstruction of the air passage, a tracheotomy should not be delayed. A blind tracheotomy can be performed with a Sheldon tracheotome, or a large caliber needle may be inserted into the cricoid-thyroid membrane to admit air into the upper trachea, but the simple removal of blood and debris from the mouth and pharynx is usually sufficient. When respiratory embarrassment has its origin in the lungs, the administration of oxygen by positive pressure, endotracheal intubation, or manual breathing may be necessary. Respiratory insufficiency may be caused also by disruption of the pneumodynamics of the pleural space. An open sucking thoracotomy or a hemopneumothorax may prevent aeration of the lungs. Occlusion of the wound with a dressing is usually sufficient in a sucking wound of the chest. Immediate tapping and aspiration are essential in hemopneumothorax. When respiratory insufficiency is due to interruption of the blood supply through or to the lungs, the administration of atropine sulfate may overcome the massive vasospasm.

Cessation of heart action requires opening the chest and rhythmic manual compression of the heart. Injection of epinephrine directly into the heart is often tried but is frequently without avail. Overt hemorrhage is usually easily treated, but concealed hemorrhage may be difficult to detect. The area of injury should give a clue whether an intrathoracic or an intra-abdominal vessel is injured, and there should be no delay in operation.

After the 3 major emergencies have been properly managed, a complete examination should be carried out. The patient may be uncooperative, either because he is under the influence of alcohol or because of head injuries, and under these circumstances injuries may be overlooked. Even in the well-oriented, cooperative patient who has undergone an automobile accident, there are areas which do not hurt and which do not point to injury, but which may prove, within 24 to 48 hours, to be quite serious. A patient who complains of a broken shoulder, leg fractures, or massive lacerations, and does not complain of chest injuries, may on the following day be found to have pneumonitis as a result of broken ribs. The physician must carefully evaluate each patient for fractures of cervical or thoracic vertebrae. The whiplash type of injury to the neck is extremely common in automobile accidents, and it is quite disabling.

Head injuries ranked first among the severe injuries in the 178 patients; 60 had concussion or other severe injury of the brain. There were 141 fractures. Minor lacerations occurred in 67 patients, major lacerations in 16, chest injuries in 8, and abdominal injuries in 6. Only one patient had severe facial injuries, and one patient had a severe eye injury. Four patients suffered evulsions of the teeth. During the past year the number of pelvic fractures seems to have increased. Eighteen of the 141 fractures were pelvic fractures, and 55 of the fractures were in the lower extremities.

Resolving Scoliosis. J. C. Scott. J. Bone & Joint Surg. 41B:105-113 (Feb.) 1959 [London].

It has been generally accepted as a working hypothesis in scoliosis that, once a curve with structural changes is present in a growing child, it will gradually increase. The extent of the increase will depend on various factors, the most important single one being the length of the growth period still ahead of the patient. Some of the unknown factors can be exemplified by the markedly different types of curve in poliomyelitis—the paralytic type and the type which the author calls "idiopathic." No reliable evidence is yet available as to what is responsible for different curve patterns. In the study of the factors concerned, the variety of curve patterns, and their progress, the author had found that this gradual increase with varying speed did not always take place. At 6 months there was a high proportion of infants (80%) having a definite lateral curve of 10 degrees or more, and this decreased without treatment, so that the incidence had fallen to 7% by 18 months and none of these children had a measurable deformity by the age of 2 years. This state of affairs was considered to be a natural infantile alignment of the spine, and the disappearance of the curve was attributed to the assumption of the erect posture. A "resolving" type of infantile scoliosis was also described in which curves of 20 degrees with structural changes gradually disappeared over intervals up to 4 years.

In this paper the author reports on 4 children in whom infantile idiopathic structural scoliosis gradually decreased during the period of active growth. The curve patterns and progress suggested that "resolving" types of scoliosis may be much more frequent and variable than is at present appreciated. These cases are of particular interest in that they all fall into the infantile "idiopathic" group, and all might have been expected to proceed to severe deformity. They were recognized at a time when full spinal growth was ahead, and all had the type of structural changes so often seen in the early stages of the progressive curve. It is of interest that the curve pattern was the same in the 4 patients. The significance of this is slight in so small a number—many of the severe curves occupy this same area—but in the progressive type the apex tends to be higher and the curves shorter. None of these patients had any treatment which could have affected the outcome in any way.

NEUROLOGY & PSYCHIATRY

Preliminary Observations on Ego Development in Children with Congenital Defects of the Genitourinary System. A. D. Fineman. Am. J. Orthopsychiat. 29:110-120 (Jan.) 1959 [New York].

This study deals with the question of whether children with particular defects in the anatomy and function of the body parts normally used in the controlled rhythmic output of urine and feces would develop specific aberrations of personality structure. Ten males and 2 females with exstrophy of the bladder, their ages ranging from 3 to 26 years, were studied during a period of about one year. All patients in this series have been treated, or are being treated, by the same type of surgical corrective procedures, which are begun sometime between the ages of 4 and 6 years. This surgical intervention results in an intact body wall and fairly normal-appearing external genitalia. Excretion of both urine and feces occurs through the anus. The reproductive organs are functional; women with this condition may give birth to normal children without difficulty; the males have erections and emit seminal fluid.

The attitudes of the mothers of these patients with congenital defects varied from direct abandonment to extreme overprotection, involving refusal to bear more children and slavish devotion to the damaged child. Since most of them were born in small hospitals where physicians and nurses were unfamiliar with this particular anomaly, the mother did not receive the support of a correctly informed and understanding physician, which *seems to* be the most important factor in the very beginning of the mother's relationship to the child.

In those patients with exstrophy of the bladder in whom there existed a functional cloaca, the anal sphincter control appeared to take on functions more closely related to urination than to defecation. The problem of night wetting showed a close resemblance to enuresis, with the complication, however, that with these patients, soiling of the bedclothes was conceived of as a much dirtier process than merely wetting with urine. Body image concepts of being a receptacle filled with dirty fluid were common. A general frequency of bowel movements as well as a poor to nonexistent control of the excretion during the preoperative period has been reported by the mothers of 5 boys. Less difficulty than expected in the control of urinary and fecal excretion was observed in the children after the operation. The mother of a boy who was operated on at 3 years 10 months reported that he was untrained preoperatively but was completely dry, day and night, 7 months postoperatively. The child's capacity for control, in this case, seemed to be markedly influenced by the mother's expectations and her feelings about the curative effect of the operation.

Three adult male patients who were observed regarding the development of their personalities were characterized by a feeling of unreality; the level of social achievement seemed to have made little inroad on this feeling. They envisaged a life of solitude as their lot. Two women who were seen were similarly characterized by fearful avoidance of close relationships and repression of affect, but with them it seemed that the apparent affectless state was maintained more as a defense against feelings of being rejected, because of their own feelings of being damaged, ugly, or distorted. They did not present a picture of utter hopelessness, as did the men, where the sole alternatives were either to succumb or to deny. In the male children, denial and restitution fantasies were freely utilized. A 5½-year-old boy said, "I can pee through the front when I want to, sometimes, or when I get bigger." It is interesting that this child, who had been damaged since birth, nevertheless demonstrated the typical oedipal fantasy of the castrating father. A 12-year-old boy, who had been institutionalized since the age of 3, has responded well to therapy insofar as his bowel control, social adjustment, and school achievement are concerned, but he still demonstrates a desperate necessity to maintain his defensive barriers almost completely intact, as did the adult males. A 10-year-old boy with excellent bowel control protected himself with such rigidity that, even after a year of weekly interviews during which his warm attachment to the therapist was quite apparent, he could allow almost no communication about his bodily defects.

This rigid defensiveness of the older children and the adults, as compared with the younger children, was greater than the difference expected because of their ages. It appeared rather as though the reality of their bodily structure and function was just too painful to bear, and the denial mechanisms which they had developed had to be carefully guarded from the peril of reality testing. These patients lived in a state of chronic anxiety. However, they were definitely amenable to therapy. In all cases, the relationship developed with the therapist was a markedly dependent one, the progress of the patient for a considerable period of time being sustained by direct giving in terms of material gifts as well as ego building; the latter efforts were reinforced by parental support plus the aid of such accessory figures as school and medical personnel.

The Alimentary Route of Infection in Tick-Borne Encephalitis. E. N. Levkovich and V. V. Pogodina. Probl. Virol. (Translation from the Russian) 3:154-160 (no. 3) 1958 [New York].

Epidemiologic and serologic studies were made on 102 patients with tick-borne encephalitis transmitted by the alimentary route through milk during an epidemic in the Kemorovo province of the Soviet Union in 1955 and in the Sverdlovsk province in 1956. In only 7 of the 102 patients did the disease have a sporadic character; in the remaining 95 patients encephalitis occurred in family groups ranging from 2 to 8 patients per focus. The incidence of the disease was higher among the younger age groups, with 25% of all the cases occurring among children, aged less than 5 years. The transmission of the disease by the use of goat's milk by all the patients was undoubted, since only 3 of the 102 patients had been bitten by ticks, and the remaining 99 patients, most of whom lived in urban areas, had not been in contact with ticks. The incubation period varied from 1 to 14 days and most often from 3 to 9 days.

Neutralization tests with diminishing doses of the virus of tick-borne encephalitis (strain F), by the method of intracerebral titration in white mice, were carried out on serums obtained at different stages of the illness from patients and their goats. In 26 of 29 patients positive neutralization indexes (from 50 to 5,623) were obtained, increasing during convalescence in most of these patients. At the same time neutralizing antibodies were detected in the serums of the goats. In some of the patients infected by the alimentary route, the immune response developed slowly; serums obtained from these patients at the 4th, 5th, and even 8th week from the onset of the disease were negative, or doubtfully positive, with respect to their neutralization indexes, and diagnostically reliable antibody levels were found only on later examinations. Of 6 isolated strains of encephalitis virus, 5 were isolated from the blood of patients in the acute stage of the disease and 1 from the blood of a goat; in their biological and antigenic properties the strains were found to be identical with each other and with a reference strain of tick-borne encephalitis virus.

In order to verify the possibility of a latent infection of man through the raw milk of goats in a focus of tick-borne encephalitis in the Kemorovo province, observations were made on persons of the healthy population and their goats, which were kept in pastures heavily infested with ticks. By careful preliminary questioning, a group was selected from an urban population never in contact with ticks, never being affected by tick-borne encephalitis or vaccinated against it, and regularly using raw milk from their own goats. It was found that most of the goats examined (13 of 19) possessed considerable titers of neutralizing antibodies. Among the owners of goats using the milk in raw state, high antibody titers were also found, which in view of the conditions of selection of the group could be explained only by infection through the milk of the infected goats. For control purposes the neutralization indexes were determined in the serum obtained from the owners of goats who did not drink the milk or who used it only after boiling. The neutralization indexes of these persons were very low. The reported data revealed that in foci of tick-borne encephalitis latent immunization of the population is possible, not only as a result of direct contact with infected ticks but also through the use of raw milk from infected goats.

The Response to the Controlled Infection by Attenuated Poliomyelitis Virus in the Neonatal Period and Early Infancy. M. Martins Da Silva. Minnesota Med. 42:83-87 (Feb.) 1959 [St. Paul].

Of 138 pregnant women who were selected for vaccination with Salk vaccine, 69 received the vaccine intradermally (0.2 cc. twice, 3 to 4 weeks apart) and the other 69 women received the vaccine subcutaneously (1 cc. twice, 3 to 4 weeks apart). Blood samples were collected immediately before the first injection and about 4 weeks after the second injection. At delivery a third specimen of maternal blood and a sample of cord blood were obtained. Blood samples were collected from the infants at about 3-month intervals for one year or until no detectable antibody titers remained. Intradermal inoculation elicited as good an antibody response as the larger subcutaneous dose in those women whose antibody titers were measurable before and after vaccination. The 3 lots of commercially prepared Salk vaccine used varied in antigenic potency. Cord blood antibody titers were equal to or within one tube difference of maternal titer at delivery in 85% of the infants in whom such comparisons could be made. The "half-life" of types 1, 2, and 3 antibodies present in the neonatal period was 37 days regardless of the level of the cord blood titers. Detectable antibody titers were present at 9 months of age in most of the infants who had an antibody level of 1:1024 or greater at birth. These findings confirmed again that poliomyelitis antibodies are passively transferred in man from mother to infant.

To a group of 25 infants, aged less than 6 months, born of mothers vaccinated during pregnancy with Salk vaccine, type 1 attenuated poliomyelitis virus (SM strain) was given orally mixed in nursery formula or regular cow's milk. The presence of virus in the feces and the immune response in each infant were followed by serial cultures of feces at weekly intervals for 5 to 12 weeks and by serum antibody determinations at 1-month to 3-month intervals up to one year. No significant untoward reactions were observed in the infants fed the attenuated virus. The antibody titers obtained in these infants were above the expected levels of passive antibodies and represented "active" antibodies which presumably were the result of vaccination. Comparison of killed Salk vaccine with the living SM vaccine thus suggests that the placentally transferred passive immunity resulting from the vaccination of mothers with Salk vaccine can be converted to an actively acquired immunity by the oral administration of SM vaccine to the infant during the phase of declining protection of maternal antibodies.

Torulosis. M. G. F. Donnan. J. Fac. Radiologists **10**:17-20 (Jan.) 1959 [Bristol, England].

Recent case reports of torulosis (cryptococcosis) indicate an increasing recognition of the disease and of its world-wide distribution. The infecting organism, Cryptococcus neoformans, is a single cell which reproduces by budding. Surrounding the organism in the tissues is a clear zone of gelatinous material. The miliary nodule is the commonest pathological lesion. Where there is a paucity of organisms, the lesion may be a fibrotic granuloma. Where there is a massive proliferation of cryptococci, the lesion may be a gelatinous mass. The portal of entry may be the skin, intestinal tract, or respiratory tract, the last most commonly. Cure has been reported after removal of isolated lung lesions. Involvement of the brain and meninges is almost uniformly fatal. The 5 patients mentioned by the author were observed in the Royal Perth Hospital, Perth, Western Australia. Two cases had been described in 1955. Of the 3 newly presented here, 2 concerned aboriginal girls, aged 17 and 16 years, respectively; the third was that of a 41-year-old white man.

In the 17-year-old girl a rounded opacity lying at the left base was detected in a mass roentgenographic chest survey. She had had one episode of severe lower chest pain, but on admission she was asymptomatic. The ovoid opacity was not homogeneous in density, and tomography demonstrated multiple fusiform radiolucent areas. A degenerated hydatid cyst was suspected. At thoracotomy a hard tumor was felt lying under the pleura of the posterior surface of the lower lobe. Lobectomy was carried out. The cut surface of the specimen showed firm, creamy tissue. Microscopically the pale tissue was seen to be necrotic lung parenchyma. Among the necrotic tissue were numerous yeasts with the morphologic and histochemical characteristics of C. neoformans. The patient was well on discharge from hospital.

The 16-year-old girl was first admitted to a hospital for aborigines complaining of pain in the neck and exhibiting erratic acts—sudden loud cries, collapsing on the floor, and clumsiness on eating. Routine examination at first elicited nothing abnormal. Later, no tendon reflexes could be elicited, and there was papilledema and optic atrophy. The patient's mental state had deteriorated, and she was incontinent. She was admitted to the Royal Perth Hospital on Nov. 4, 1954. Physical examination and cytological and biochemical examination of the cerebrospinal fluid suggested a tuberculous meningitis, but the tubercle bacillus was neither identified nor cultured. Cerebral angiography was inconclusive. Ventricular drainage was instituted, but after 3 days the patient pulled the catheter out. Some days later cryptococci were found on direct smear of the cerebrospinal fluid obtained by lumbar puncture. The patient died on Jan. 1, 1955. Autopsy revealed extensive brain lesions and granulomas in the lung, which contained numerous cryptococci.

The 41-year-old man dated his symptoms of left-sided hemiparesis and hemianesthesia from an accidental blow to the face 8 months previously. Five years previously he had had a right lower lobectomy for bronchiectasis. The findings on roentgenoscopy of the skull suggested the possibility of a thalamic space-occupying lesion, but there was no papilledema and the cerebrospinal fluid was normal, and he was discharged. Several months later the patient was readmitted as unmanageable. There had been progression of his symptoms, and, in addition, he had headache and diplopia and was vomiting. Vomiting persisted; he became comatose and died several weeks later.

Autopsy revealed a large, gelatinous, light brownish mass occupying the right side of the thalamus and the hypothalamus. Inferiorly and medially, the mass extended into the midbrain. There was an old subarachnoid hemorrhage in the parietal region on the left and in this region was a brownish, wedge-shaped cystic infarct involving both cortex and white matter. The adjacent sulci contained fibrinous exudate which also appeared gelatinous. Histologically, the right side of the thalamus was a mass of cryptococci. The left-sided parietal cortex showed cortical invasion by cryptococci with some gliosis and spread of the organisms to the subarachnoid space, with a localized area of meningitis. Section of a small lung focus showed a mass of cryptococci with surrounding fibrosis. The final diagnosis was torulosis of the lung with spread to the parietal cortex and thalamus.

Some Peculiarities of the Seasonal Occurrence of Poliomyelitis in Finland. P. Nuorteva. Ann. med. exper. et biol. Fenniae 36:335-342 (no. 4) 1958 (In English) [Helsinki].

In the temperate climates poliomyelitis is prevalent in spring and summer. This epidemiologic behavior is poorly understood, as freezing does not inactivate the poliomyelitis virus. The assumption that flies or other arthropods act as tranmitters of poliomyelitis during the epidemics could offer an explanation for the epidemiologic behavior of this disease. In fact, viruses of poliomyelitis have been extracted from houseflies and from several species of blowflies collected during or before epidemics. In the present article, attention is drawn to some peculiar features in the seasonal occurrence of poliomyelitis in Finland, and an attempt is made to elucidate these peculiarities from an entomologist's point of view. The cases on which this report is based had been reported to the Medical Board of Finland during the years 1938-1957.

Notes on the flying times and geographical distribution of some flies are based on the records of the trapping dates and of the localities of these insects in the Entomologic Museum of Helsinki. The series examined for this paper consisted of more than 1,000 specimens of the genus Lucilia collected by different persons in 95 parishes situated in various parts of Finland. It was found that in 3 provinces along the southern coastal area of Finland poliomyelitis occurred somewhat later than in the other provinces. This fact can be correlated with the occurrence of the virus-spreading blowfly, L. sericata Meig., which occurs only in the southern coastal area and which shows a seasonal maximum of abundance later in the season than do other flies. The commoner occurrence of poliomyelitis in winter in the northern provinces than in the south is discussed in connection with a hypothetical transmission of the disease by overwintering flies and cockroaches.

Mental Disorders in Cerebral Cysticercosis. R. Jeri. Rev. psiq. peruana 1:211-227 (July-Dec.) 1958 (In Spanish) [Lima, Peru].

Thirty-two patients with cerebral cysticercosis were observed in the Sanatorio de Enfermedades Nerviosas y Mentales and in the department of mental diseases of the Instituto Nacional de Enfermedades Neoplásicas, both in Lima, Peru. Twenty-eight of the patients had mental disturbances. All the patients had a history of having suffered for a long time with headache, convulsions of all types of epilepsy, visual disorders, certain forms of paresis, and other neurological symptoms. In all of them the symptoms corresponded to a cerebral lesion (focal or diffuse) or a lesion in the infratentorial structures. One of the patients died in status epilepticus. A diagnosis of cerebral cysticercosis was made in 29 patients by the results of one, or more than one, of the techniques used in the diagnosis of neurosurgical diseases or else an explorative craniotomy; it was made during autopsy in 3 cases. Cysticercosis was cystic (single or multiple) in 10 cases, racemose in 8, and mixed cystic and racemose in 14. The foci of infestation by cysticerci were the cerebral hemispheres in 18 cases, the posterior cranial fossa in 31, and the spinal cord in 1. Some of the patients had simultaneously hemispheral, ventricular, and cisternal cysticercosis. The infestation was chronic in all cases. The mental disorders consisted of acute delirium, psychotic reactions of the chronic toxicoinfectious type, and severe changes of personality. Careful neuropsychiatric observation of the patients permitted reaching a diagnosis of cerebral cysticercosis after elimination of the diagnoses of schizophrenia or manic-depressive reaction previously made in the patients.

The author concludes that examination of the central nervous system by means of rachicentesis, radiology of the cranium, ventriculography, and explorative craniotomy is indispensable in all patients with associated focal or diffuse neurological symptoms, mental disturbances, and convulsions, in search of clues for cerebral cysticercosis as the cause of the mental disorder. There is no relation between the acuteness and type of psychosis and the type and cerebral location of cysticercosis and extension of the infected foci, except in cases of chronic racemose cysticercosis. In the latter form the severity of dementia parallels the extension of atrophy, which results from both the obstructive hydrocephalus and the disorders of local circulation which follow cysticercotic periarteritis and endoarteritis.

GYNECOLOGY & OBSTETRICS

A Little-Known Form of Mammary Dystrophy: Dilated and Secreting Lactiferous Ducts. G. Seillé and J. de Brux. Presse méd. 66:2051-2053 (Dec. 25) 1958 (In French) [Paris].

The syndrome of dilated and secreting lactiferous ducts is not well known. It was observed by the authors in 10 women during a period of 6 months; one patient was 40 years of age, and the others were in the period immediately preceding or following the menopause. The clinical symptoms of this syndrome vary. The secretion may appear as a milky discharge from the breast in a filiform spurt on moderate compression of an area on or around the areola mammae. A small, painful tumor may be present in, or absent from, the area under the areola. Alternatively, the milky secretion of the mammary glands in women at the menopause may accumulate in the ampullae of the lactiferous ducts in the region of the areola without being excreted from, or reabsorbed by, the body. This benign lesion consists of a dilatation, from 3 to 7 mm. in diameter, of 3 to 20 bluish lactiferous ducts under the areola, which ducts undergo a scleroinflammatory process. The syndrome is macroscopically distinguishable from malignancy, *since incising the affected lactiferous ducts produces* a milky discharge instead of dark-red blood. If the tumor is related to a subsequent suppurative process, with ulceration of the skin and fistulization, an erroneous diagnosis of tuberculosis may ensue. Microscopic examination of the milky discharge reveals the presence of lipids, desquamated cells of small vessels, and absence of both blood corpuscles and epitheliomatous cells.

The correct diagnosis of this syndrome prevents performance of unnecessary mastectomy. Treatment is surgical, being similar to the operation for dendritic adenoma. If the lesion is associated with inflammation, a combined cortisone and local or general antibiotic therapy is recommended preoperatively. The authors believe that the etiology of this syndrome is unrelated to a lactational disorder, but may be attributed to either a dystrophic lesion or an unexpected secretion of a quiescent gland.

A Study on the Behavior of C-Reactive Protein During the Puerperium and in Normal Conditions. F. Calapà. Minerva ginec. 10:885-888 (Nov. 30) 1958 (In Italian) [Turin, Italy].

The presence of C-reactive protein was studied in 60 normal pregnant women—10 in the first trimester of pregnancy, 20 in the second trimester, and 30 in the third trimester; in 90 women in labor after a normal pregnancy—50 women were in the dilating phase and 40 in the expulsive phase; in 80 normal puerperas—80 were followed from the 1st to the 7th day, and 20 from the 8th to the 14th day after labor; and in 5 women in whom the behavior of C-reactive protein was followed from the third trimester of pregnancy to the 7th day of the puerperium. Two methods based upon an *immunological response* were used: (*a*) the agglutination reaction with specific rabbit antiserum (McLeod and Avery method) and (*b*) the complement-fixation reaction with rabbit antiserum (Mushel and Weatherwax method). No difference was found in the results obtained by the 2 methods. The search for C-reactive protein gave positive results in 30% of all the tests made. Positivity was not so frequent during the first months of pregnancy but tended to become more frequent with the advancement of pregnancy; positive results were obtained in 10% of the patients in the first trimester of pregnancy, in 25% of those in the second trimester, and in 40% of those in the third trimester. Positive results were frequent in patients in labor—in 36% of the patients in the dilating phase and in 100% of those in the expulsive phase. Marked positive results were obtained in the tests given to the puerperas—in 76% of the patients followed from the 1st to the 7th day of the puerperium and in 60% of those followed from the 8th to the 14th day. The positivity of the *C-reactive protein tests given to the 5 patients* followed from the third trimester of pregnancy to the 7th day of the puerperium became marked during labor and increased more so during the first few days of the puerperium. The author concludes that in normal pregnancy C-reactive protein appears in the serum around the 7th month of pregnancy and that it increases with the evolution of pregnancy, during labor, and during the puerperium.

Effect of Serotonin upon Labor in Women. A. Valsecchi. Minerva ginec. 10:898-901 (Nov. 30) 1958 (In Italian) [Turin, Italy].

The effect of serotonin was studied in a group of 22 women, 16 primiparas and 6 pluriparas, in whom labor was induced because of uterine inertia, or premature rupture of the membrane with infection of the amniotic fluid, or prolonged pregnancy. Each patient received a 10-mg. intramuscular injection of a double salt of serotonin (5-hydroxytryptamine creatinine sulfate); a second injection of 10 mg. was given *intramuscularly* after 30 minutes, and a third injection of 5 mg. after 2 hours. In some women serotonin was given because other drugs administered previously had had no effect. During the administration of serotonin it was observed that tachycardia, present at the beginning of the injection, decreased progressively and that after a maximum of 20 minutes it had disappeared; the blood pressure went up 10 to 25 mm. Hg in 12 patients but returned to normal values after a maximum of 15 minutes; and tachypnea lasting 30 to 60 seconds was observed in 8 patients, but disappeared as soon as the administration of the drug was suspended. Bradycardia of the fetus occurred in 15 patients, but this phenomenon did not indicate that the drug caused suffering to the fetus, since all the living infants were born normal; treatment of one patient was started when the fetus was already dead, and in 2 other patients the suffering of the fetus was caused by dystocia of the umbilical cord. Of the 22 patients in whom it was necessary to induce labor, 13 presented an excellent and satisfactory course with expulsion of the fetus; failures were observed in the remaining 9 patients. The author believes that a particular endocrine equilibrium is necessary in order that serotonin may be able to manifest its oxytocic effect. The drug caused brief, but significant, changes in the cardiocirculatory and respiratory systems of the mother and had some effect as well on the heart beat of the fetus. Passage of serotonin through the placenta is believed to be possible.

THERAPEUTICS

Triamcinolone in Rheumatoid Arthritis and Psoriatic Arthritis. S. J. Bosch, O. García Morteo, A. Porrini and others. Medicina 18:103-108 (June) 1958 (In Spanish) [Buenos Aires].

Triamcinolone (9-alpha-fluoro-16-alpha-hydroxy-prednisolone) was given to a group of 19 patients, made up of 15 patients with rheumatoid arthritis and 4 with psoriatic arthritis. Most of the patients were women, between the ages of 19 and 69 years. When triamcinolone therapy was started, 11 patients had failed to respond to prednisone administered for a long period, 2 were receiving corticotropin (ACTH), and 6 had not had any previous steroid treatment. Triamcinolone was given in daily amounts of 12 mg. divided into 4 doses. The drug was given uninterruptedly for a period which varied between 1 month and 4 months. In the majority of the patients the daily maintenance dosage also proved to be 12 mg. The functional capacity improved greatly in all the patients who had a capacity of the first and the second class; it improved moderately in those with a capacity of the third class and in one of the 2 patients with a functional capacity of the fourth class. In the whole group of 19 patients there was complete remission of the arthritis in 4 patients, great improvement in 8, moderate improvement in 5, and failure of the treatment in 2. In cases of psoriasis there was complete remission of the skin disease in 1 patient and great improvement in 3. In all cases peeling of the psoriatic lesions and their size diminished, and pruritus entirely disappeared. All the patients with psoriasis stated that the relief afforded by triamcinolone had never been obtained with any other treatment. There was a loss of weight (from 1 to 6 kg. [3 to 13 lb.]) during the treatment in 10 patients. Six patients complained of excessive gastric acidity, which made it necessary to stop the treatment in one patient. Two patients complained about nausea and dizziness, 2 showed moderate hypertension, and 2 experienced debility of the legs. Nine patients had moon face, but they had it before the administration of triamcinolone as a result of previous treatment. None of the patients had edema. The authors conclude that the results of the treatment are promising. However, the observations are still recent. A greater number of patients and observations on them for longer periods will be necessary to reach conclusions.

Clinical Experiences with the Antibiotic Sigmamycin, with Particular Consideration of Its Effect on the Intestinal Flora. R. Blass. Schweiz. med. Wchnschr. 89:158-161 (Feb. 7) 1959 (In German) [Basel, Switzerland].

The author reports on 117 patients with various infections, such as pneumonia, abscess, furunculosis, phlegmon, paronychia, osteomyelitis, lymphadenitis, pleural empyema, peritonitis, urogenital infections, and wound infections, who were treated with Sigmamycin, an antibiotic compound of tetracycline and oleandomycin, at the surgical clinic of the University in Zurich, Switzerland. As a rule, 1.5 Gm. of the drug in 3 subdivided doses at 8-hour intervals was given daily for 5 days. Bacteriological examination of the feces was carried out before the institution of therapy and on the 5th day of therapy. Of the 117 patients, 93 had been treated unsuccessfully for 3 to 21 days with streptomycin and penicillin before the institution of Sigmamycin therapy; the remaining 24 were treated primarily with Sigmamycin. In 48 of the 117 patients the causative agent was Staphylococcus pyogenes var. aureus, and in the other patients various gram-positive and gram-negative causative agents were found. The results obtained showed the high effectiveness of Sigmamycin, particularly in the patients with suppurative infections, most of which were caused by Staph. pyogenes var. aureus. By breaking through the resistance of the latter causative agent, especially in cases of typical endemic hospital infections, Sigmamycin proved to be a valuable addition to the medicinal armamentarium.

Disturbances of the intestinal flora which had been observed in patients treated with broad-spectrum antibiotics were observed again in the patients treated with Sigmamycin. Considerable reduction in the titers of Escherichia coli and Aerobacter organisms to numbers ranging from 1,000 to 10,000 and less was observed in 17 patients

(14%). In 46 patients variations in titer values were not observed, and in the remaining 54 patients the titer values were reduced, but not below one million bacteria per gram of feces. The frequency of intestinal evacuations was running parallel with the reduction in Escherichia and Aerobacter titers. In general, the consistence and amount of the feces decreased in the course of the administration of Sigmamycin. Diarrhea occurred only in 6 cachectic patients of advanced age. In only 2 of the 6 patients were the titer values considerably decreased and resistant bacteria present in large amounts. The results of the bacterial examination of the feces remained normal in the 4 other patients.

These observations make the frequently reported relationship of enteritic phenomena with the occasionally severe disturbances in the intestinal flora depending on the administration of antibiotics questionable. Despite the few untoward reactions to Sigmamycin in this series, its use may occasionally interfere seriously with the balance of the micro-organisms in the intestine; therefore, penicillin and streptomycin, which are the best tolerated antibiotics, should always be given first choice, and Sigmamycin second choice.

Thioctic Acid and the Modifications of Lipid Metabolism in Cardioangiopathic Atherosclerotic Patients. R. Cattaneo, E. Levi and C. Prinotti. Acta gerontol. 8:123-140 (July-Sept.) 1958 (In Italian) [Milan, Italy].

The therapeutic effect of thioctic acid was studied in 15 patients with hypercholesteremia. The patients ranged in age from 48 to 70 years (average, 58), and all of them had vascular or cardiac disease with a definite tendency toward atherosclerosis or arteriosclerosis. The lowest value of total cholesterol in the serum was 206 mg. per 100 cc., and the highest was 322 mg. per 100 cc. The patients received one intramuscular injection of 50 mg. of thioctic acid each day for 7 consecutive days. The values of cholesterol were determined at the beginning and again at the end of treatment. Treatment with thioctic acid caused a marked drop in the cholesterol level. Total cholesterol dropped from an average of 245 mg. per 100 cc. to an average of 213 mg. per 100 cc. (a 13% drop); esters of cholesterol dropped from an average of 223 mg. per 100 cc. to an average of 184 mg. per 100 cc. (a 17% drop); combined cholesterol dropped from an average of 132 mg. per 100 cc. to an average of 109 mg. per 100 cc. (a 17% drop); and free cholesterol dropped from an average of 112 mg. per 100 cc. to an average of 104 mg. per 100 cc. (a 7% drop). Alpha-lipoproteins increased from an average of 19.4 mg. per 100 cc. to an average of 24.4 mg. per 100 cc. (a 26% increase), and beta-lipoproteins dropped from an average of 80.6 mg. per 100 cc. to an average of 75.6 mg. per 100 cc. (a 6% drop). The authors think that the effect of thioctic acid is such that, if it is permanent (their observations were limited to a very short period of time), the acid can be used effectively in the treatment of patients with hypercholesteremia.

Thrombocytopenia During Chlorothiazide Treatment. P. Nordquist, G. Cramer and P. Björntorp. Lancet 1:271-272 (Feb. 7) 1959 [London].

The authors describe observations on 6 patients in whom thrombocytopenia developed during treatment with the orally administered diuretic compound, chlorothiazide. Three of them also had a purpuric rash. To confirm that chlorothiazide was the cause of the thrombocytopenia, test doses were given and in vitro tests were made in 2 of the patients, and patch tests were performed in 3. The in vitro tests were: (1) inhibition of clot retraction, (2) immune-precipitate formation, and (3) platelet agglutination and lysis. In addition, platelet agglutination was studied on stained blood films. In 2 of the patients there was a direct connection between chlorothiazide and the thrombocytopenia, and a third showed positive in vitro tests for chlorothiazide.

Chlorothiazide was used at the clinic with which the authors are connected in about 400 patients last year, which indicates that a decrease in circulating platelets may appear in more than 1% of the patients. The thrombocytopenia was the only toxic manifestation of chlorothiazide in the bone marrow. The reaction was usually brief, and the platelet count returned to normal as soon as chlorothiazide was withdrawn. These observations indicate the desirability of doing a blood cell count when chlorothiazide is given to older and debilitated patients, or when it is combined with other drugs that may have a depressing effect on the hematopoietic system.

Acute Hepatic Necrosis Following Iproniazid Therapy: Value of Glutamic-Oxaloacetic Transaminase Estimation in Early Detection. C. M. B. Pare and M. Sandler. Lancet 1:282-284 (Feb. 7) 1959 [London].

The authors present 2 patients in whom acute hepatic necrosis developed after iproniazid therapy. One patient, who recovered, was being treated for intractable angina of effort; the other, who died, was taking part in a trial of this drug in the treatment of depression. When during this trial it became known that liver damage occasionally develops after treatment with iproniazid, the authors carried out liver function tests in order to detect early changes which might indicate this complication. The determination of the serum glutamic oxalacetic transaminase (SGO-T) level has recently come into extensive use as an index of hepatocellular damage. The authors estimated the SGO-T level in 29 patients undergoing treatment with iproniazid, and they found raised levels in 9. While the significance of this finding is still uncertain, in the interest of the safety of the patients a raised SGO-T level should be regarded as presumptive evidence of early hepatic damage, and discontinuance of treatment with iproniazid would seem advisable.

PATHOLOGY

On the Role of the Thyroid in Native Resistance to Tuberculosis: I. The Effect of Hyperthyroidism.

M. B. Lurie, P. Zappasodi, R. S. Levy and R. G. Blaker. Am. Rev. Tuberc. 79:152-179 (Feb.) 1959 [New York].

Since thyroid hormones increase the metabolism of cells and accelerate growth and differentiation, experiments were performed on about 350 rabbits, belonging to 8 different races of different genetic resistance to tuberculosis and of varying degrees of inbreeding, in an attempt to ascertain whether the native resistance to tuberculosis might be increased in certain races by increasing the amount of thyroid hormones available to the tissues. The effect of hyperthyroidism was tested on the same genetic strain with litter mates in the control-test and experimental groups. Hyperthyroidism was induced by the administration of L-triiodothyronine or L-thyroxin intramuscularly for 2 to 4 weeks before the exposure to a single quantitative inhalation of virulent human tubercle bacilli, H37Rv. Injections of the hormones then were made daily or 3 times weekly during the course of the resultant tuberculous infection.

The results showed that hyperthyroidism induced by the administration of the 2 hormones utilized in these experiments suppressed to a greater or less degree the inception and progress of the pulmonary tuberculosis produced by the quantitative inhalation of human tubercle bacilli in 4 races of rabbits with low or intermediate genetic resistance to the disease. L-triiodothyronine, a substance which is 2 to 5 times more active than L-thyroxin, also exerted a definite suppressive influence on the development of an already existing tuberculosis when the hormone was administered 3 weeks after the infection. The native resistance of the highly inbred and most susceptible rabbit race could not be materially increased by this treatment. By cultural methods it was found that the administration of both the hormones utilized in the experiments markedly restrained the accumulation of bacilli in the lungs and increased, to a varying degree, their spread to the draining lymph nodes. Microscopic studies substantiated the gross and cultural observations. Whenever these hormones exerted a conspicuous inhibitory effect on the inception and progress of tuberculosis, there was a concomitant sharp reduction in tuberculin sensitivity.

The difference in host-parasite relationships between treated and untreated rabbits of the same genetic resistance was of the same bacteriological and pathological nature as that between untreated natively resistant and susceptible rabbits. Genetic resistance is characterized by high innate ability of the tissues to inhibit the accumulation of tubercle bacilli and by a marked spread of the bacilli from the portal of entry to the draining lymph nodes. The administration of thyroid hormones to certain races is likewise characterized by an increased inhibitory capacity of their tissues against the accumulation of tubercle bacilli, by an enhancement of the spread of the bacilli from the lung to the draining nodes, and by an increased resistance to the disease.

On the Role of the Thyroid in Native Resistance to Tuberculosis: II. The Effect of Hypothyroidism: The Mode of Action of Thyroid Hormones.

M. B. Lurie, P. Zappasodi, R. G. Blaker and R. S. Levy. Am. Rev. Tuberc. 79:180-203 (Feb.) 1959 [New York].

Since the data reported in the preceding paper showed that hyperthyroidism increases resistance to tuberculosis, it should follow that hypothyroidism would reduce it. In an attempt to confirm this assumption, hypothyroidism was produced by thyroidectomy, or by the subcutaneous administration of 100 mg. of propylthiouracil suspended in sodium chloride solution 5 times a week, in rabbits of 3 of the 8 races used in the previous experiments (1 of very high resistance, 1 of intermediate resistance, and 1 of low resistance), which were then exposed to the quantitative inhalation of virulent human tubercle bacilli as in the preceding study.

The results showed that hypothyroidism induced by thyroidectomy or the administration of propylthiouracil reduced the native resistance of the inbred rabbits to the inception and progress of tuberculosis. This was largely effected by an enhancement of the accumulation of the bacilli in the tissues and the consequent extension of caseation. Thyroidectomy tended to induce a marked atrophy of the spleen, in contrast to the hypertrophy of the spleen induced by thyroid hormone treatment; propylthiouracil did not produce any change in the spleen. Despite the marked accumulation of bacilli in the lesions of hypothyroid rabbits, their tuberculin sensitivity was markedly reduced, particularly in rabbits which had undergone thyroidectomy. Similarly the perifocal inflammation about the extensive caseous foci in the latter was reduced. This is ascribed to the reduced inflammatory irritability of the tissues in the hypothyroid state. The host-parasite relationship in the hypothyroid rabbits is, in many respects, similar to that of natively susceptible rabbits or rabbits under the influence of cortisone; this relationship in hyperthyroid rabbits is similar to natively resistant animals. These parallels were shown by the growth and destruction of bacilli, by the extent of caseation, and (to some extent) by the spread of bacilli from the site of invasion.

Concerning the mode of action of thyroid states on enhancing or suppressing the growth of bacilli, mere increase in oxygen consumption is not a factor in this process, for dinitrophenol, a calorigenic agent, reduced resistance and increased the number of bacilli in the lesions; and an elevation of the metabolic rate of certain races by triiodothyronine failed to increase resistance. In certain rabbits, hyperthyroidism tended to accelerate antibody formation to a nonspecific antigen, bovine serum albumin. Thyroidectomy definitely and significantly retarded and depressed antibody formation to this antigen. Whether this is due to a reduction of individual cellular activity or to other factors has not been determined. There was no difference in the basal metabolic rate of natively resistant and susceptible rabbits; however, tuberculosis caused hypertrophy of the thyroid gland in certain untreated rabbits. The differing host-parasite relationships in different thyroid states are consistent with the concept that thyroid function is one of the constitutional factors controlling native resistance to tuberculosis in rabbits.

On the Presence in the Human Saliva of a Hemoagglutination-Inhibiting Factor Affecting the Parotitic (Mumps) Virus. C. A. Romanzi and P. Filippi. Gior. batt. e immunol. 51:229-237 (May-Oct.) 1958 (In Italian) [Turin, Italy].

The authors studied the influence of human saliva on the hemoagglutination activity and the infective power of the mumps virus. The saliva was collected from normal adults in a quantity of 20 to 30 cc. on an empty stomach. The mumps virus used was of the Enders strain, and at the moment of the tests it had a hemoagglutination value of 1/640 and an infective value of $10^{-4.6}$. Results of tests relative to the effect of undiluted saliva on scalar dilutions of the virus showed that the saliva had a marked hemoagglutination-inhibiting effect; the intensity of these results varied according to the subject who had given the saliva and the day when the saliva was given. Storing the saliva at 4 C decreased slightly its hemoagglutination-inhibiting effect. Other tests showed that saliva had no effect on the infective power of the mumps virus inoculated in embryonated chicken eggs. Tests on the direct effect of saliva on erythrocytes showed that in most cases the treatment of red blood corpuscles with saliva did not interfere with the agglutination of the same corpuscles by the mumps virus, showing that the hemoagglutination-inhibiting effect takes place directly on the virus rather than on the red blood corpuscles. Spontaneous agglutination of the red blood corpuscles after contact with the saliva occurred in a few cases. Heating of the saliva at 56 C for 30 minutes did not cause any changes in the results. Tests made to compare the hemoagglutination-inhibiting effect of saliva and the hemoagglutination-inhibiting effect possessed by the serum of the same subject showed that the 2 effects are completely separated and that the effect of saliva is not due to the possible presence of serum antibodies within the same saliva. The authors believe that saliva contains an inhibiting "element" which acts on the mumps virus and checks its hemoagglutination activity.

Fatigue and Tumors: On the Influence of Fatigue Induced by Swimming on the Development of Lipschütz Ascites Tumor in Mice. L. A. Ardoino and S. Matracia. Cancro 11:392-405 (no. 5) 1958 (In Italian) [Turin, Italy].

A number of male and female mice were inoculated intraperitoneally with 25 cc. of Lipschütz polyploid ascites tumor. Some of the animals were kept as a contratest group, and the rest were subjected to fatigue by making them swim in water at 28 to 30 C for 45 minutes every day for 12 days. The animals were weighed before the inoculation of the tumor cells, on the 6th day after the inoculation, and on the 12th day; on the latter day they were killed by decapitation. A slight increase in body weight and a marked reduction in the total volume of ascites tumor were found in the animals subjected to fatigue as compared with the contratest animals. The average volume of ascites tumor of 18 animals subjected to fatigue was 1.61 cc., and in 18 contratest animals it was 6.55 cc. The total number of tumor cells contained in the ascitic fluid from the test mice subjected to fatigue was much lower than that from the contratest mice. The mitotic rate was low in the test mice, and when the ascitic fluid obtained from them was rendered cell-free by centrifugation, it was generally less turbid than the fluid from the contratest mice.

There was no difference in the ultraviolet absorption spectrums of the cell-free fluids from the two groups of mice. In both groups the ascitic fluid showed substances which had the spectrum of nucleoproteins, being characterized by a curve with a high of 2750 A and a low of 2500 A. Small masses of solid tumor were found frequently in the abdominal cavity of animals subjected to fatigue; these masses were absent in the contratest animals. The small masses of tumor had developed mainly on the serous coat, in the tunica muscularis of the intestinal loops, and in the mesenteric tissue; growth on the parietal layer of the peritoneum was rare. The authors believe that the differences in results obtained in the group of mice subjected to fatigue were caused by the stressing effect of the fatigue, and especially by the changes in the phlogistic reactivity of the vascular and mesenchymal tissues which play an important role in the growth of tumor.

Carcinoma of the Renal Cortex: Pathology and Prognosis. J. H. Childers. Texas J. Med. 55:96-98 (Feb.) 1959 [Austin].

Gross pathological and microscopic studies were performed by the author on specimens obtained during surgery or at autopsy from 47 patients with carcinoma of the renal cortex, who were admitted to the University of Texas Medical Branch Hospitals in Galveston between January, 1945, and December, 1954. The average age of these patients was 56.8 years. Thirty-one patients were men, and 16 were women. Only 39 of the 47 patients were suitable for detailed study, since the condition of 8 was diagnosed by histological study of tissue removed for biopsy and since they subsequently did not have a nephrectomy or autopsy. In each of these 8 patients roentgenologic and clinical studies confirmed the biopsy diagnosis of carcinoma of the kidney. In reviewing the 39 surgical and autopsy specimens, gross pathological changes were recorded. The diameter of the mass, as recorded in 38 patients, was less than 5 cm. in 4 patients, 5 to 10 cm. in 22, and more than 10 cm. in 12. The major part of the mass was located in the upper pole in 16 patients, in the midportion in 1, and in the lower pole in 7; in 11 patients it replaced most of the kidney. Multiple sections were studied from each neoplasm to determine the predominant cell type, grade of the neoplasm, extension, and vascular involvement. Twenty cases were classed as clear-cell type, 11 as granular-cell type, and 8 as mixed (granular-cell and clear-cell) type. The cases were classified according to the index of Hand and Broders; 7 cases were classed as grade 1 (least malignant), 17 as grade 2, 14 as grade 3, and 1 as grade 4. Sections taken at the hilar region of the kidney confirmed the gross observations of vein invasion in 10 instances and revealed microscopically areas of vascular invasion in 10 additional cases. Microscopic evidence of vein involvement was present in 20 patients.

Follow-up information was obtained early in 1958 regarding the present status of 8 patients in this series who are still living from 41 to 98 months after the operation. Thirty-seven patients of the total series died, and 2 patients were lost to follow-up. A favorable prognosis, as seen in these 8 patients, could not be correlated with age, sex, size of the mass, ulceration of the pelvis, extension through the capsule, histological grade, association with renal calculi, hemorrhage, or necrosis. Two of the 8 patients survived 98 and 44 months in spite of metastatic pulmonary disease. The presence of gross areas of calcification in the cut sections of the neoplasm was mentioned in 6 cases; 3 of these patients were alive and had an average survival of 63 months at the time of follow-up. Three patients with findings of vascular invasion had an average survival rate of 58 months after nephrectomy, which shows that demonstration of vascular invasion should not be construed as a hopeless sign. Four of the 8 living patients had neoplasms composed of clear cells, and 4 had neoplasms of the clear-cell and granular-cell variety. For all 39 patients, the survival rate was 40 months in patients with the finding of mixed (clear-cell and granular-cell) type of carcinoma; in those with clear-cell type of carcinoma it was 20 months; and in those with granular-cell type of carcinoma it was 8.4 months.

Carcinoid in the Duodenum. P. E. Rasmussen. Ugesk. læger 121:13-15 (Jan. 1) 1959 (In Danish) [Copenhagen].

Carcinoids are tumors developed from the argentaffin cells, cells of Kultschitzky, at the bottom of the Lieberkühn crypts in the intestine. These tumors are potentially malignant and, depending on the location, tend to metastasize to the regionary lymph nodes and the liver. The appendicular carcinoids are almost always benign; from 20 to 75% of the extra-appendicular tumors are considered to be malignant. The appendicular carcinoids are found twice as often in women as in men, with average age of 25 years, while the others are equally apportioned between the sexes, with average age of 55. The so-called carcinoid syndrome, attributed to an increased blood content of serotonin, secreted by the Kultschitzky cells, comprises carcinoid with extensive metastases, pulmonary stenosis or tricuspid lesion, and intermittent flush in the face and possibly on the extremities. While the diagnosis of carcinoid could earlier be made only at operation and histological examination, preoperative diagnosis is now possible by the establishment of the carcinoid syndrome and/or establishment of an increased serotonin content of the blood and urine. Because of the potential malignity, the disease should be treated as cancer, although patients with metastases to the liver have lived up to 20 years after diagnosis. Complete removal of the tumor and all metastases is thought to give a good chance of cure or at least a long period free from symptoms.

Postoperative diagnosis of carcinoid was made in a woman, aged 64 years, who had had repeated hematemesis for 9 years. No metastases were demonstrable at operation. There was a heart disorder, and auscultation pointed to affection of the tricuspid valves. The patient's face was remarkably flushed. Examination of the urine for serotonin about 2 weeks after operative removal of the tumor gave negative results. A month and a half after the operation marked paling of the ruddy complexion had occurred. The hemorrhages are ascribed to erosions of the mucous membrane over the tumor or stasis bleeding from pressure of the tumor on the mucous membrane.

Some Effects of Stenosis of the Terminal Common Bile Duct on the Biliary Tract and Liver: An Experimental Study. J. V. Pikula and J. E. Dunphy. New England J. Med. 260:315-318 (Feb. 12) 1959 [Boston].

Obstruction to the flow of bile has been considered an important factor in the formation of gallstones. The authors cite investigators who suggested that stenosis of the terminal biliary papilla or sphincter may be an important cause of gallstones. To investigate this possibility further, incomplete stricture of the lower common bile duct was produced in 13 dogs. A band of Cellophane was sutured around the lower common bile duct. In 7 experiments the band was lightly sprinkled with sodium dicetyl phosphate. The serum alkaline phosphatase, the electrophoretic pattern of serum alkaline phosphatase and serum proteins, the serum bilirubin, the color of the stools, and biopsies of the liver were studied at intervals until the experiment was completed by the death or killing of the animal. In 5 animals the pressure within the biliary tract was determined. At postmortem examination the degree of stricture was ascertained, and the biliary passages and liver were examined grossly and microscopically. It was found that incomplete stricture of the lower common bile duct in dogs was associated with a rapid elevation of serum alkaline phosphatase, variable elevation of serum bilirubin, and progressive biliary cirrhosis. Gallstones occurred in 5 of 9 experiments in which an incomplete stricture without acholic stools was produced. It was not clear why the serum alkaline phosphatase should be lower in the animals with jaundice and in which gallstones formed.

If one assumes that the source of the serum alkaline phosphatase is the epithelium of the biliary passages, it may be that in the more extreme degrees of obstruction in which jaundice develops and gallstones form, there is interference with the function of the biliary epithelium and hence a lower alkaline phosphatase. It is also evident that under the conditions of these experiments the development of gallstones is but one facet of a derangement of biliary and hepatic function characterized by stasis, high alkaline phosphatase, varying degrees of jaundice, and extensive gross and microscopic damage to the liver. The experimental syndrome is much closer to the clinical picture of cholangiolitic hepatitis or primary biliary cirrhosis than it is to uncomplicated cholelithiasis in man. Since it is rare in man to have such marked derangement of hepatic and biliary tract function in association with gallstones, the present study does not provide confirmatory evidence that stenosis of the biliary tract is a common primary cause of gallstones in man. The degree of stenosis in these experiments may be a crucial determining factor. The present study does not exclude the possibility that very slight stenosis or malfunction of the lower common bile duct leads to gallstones without the development of concomitant extensive disease in the liver.

ANESTHESIA

Anileridine as an Anesthetic Agent. J. T. Stage. Internat. J. Anesth. 6:25-28 (Jan.) 1959 [Baltimore].

Anileridine (Leritine) is a new narcotic agent with an analgesic potency approaching that of morphine and several times greater than that of meperidine. The analgesic effect begins within 15 to 30 minutes after administration and lasts from 5 to 6 hours. In dogs, subcutaneous administration of 8 mg. of anileridine per kilogram of body weight produces strong analgesia lasting for over 6 hours. Unlike morphine, anileridine has shown no emetic action in dogs. The compound is also effective orally. Nalorphine reverses the action of anileridine, antagonizing both the analgesic effect and the mild respiratory depression produced by the drug.

The author used anileridine in a series of 100 patients undergoing various surgical procedures. He administered the compound in place of meperidine as a primary anesthetic agent, in conjunction with nitrous oxide, thiopental sodium, and tubocurarine. Initial trials with intermittent doses were later abandoned in favor of the continuous drip method. Anileridine appeared to be more potent than meperidine, and with the drip method no significant apnea or hypotension occurred. Patients responded to command before leaving the operating table, and manifested little excitement on awakening. Analgesia appeared to persist up to 3 hours postoperatively. The new narcotic appeared to be a safe and satisfactory compound for use as a primary anesthetic agent. The combination of anileridine with nitrous oxide, thiopental sodium, and tubocurarine provided an adequate, controllable, and nonexplosive mixture.

The Use of Heparin to Minimize Thrombocytopenia and Bleeding Tendency During Hypothermia. R. H. Wensel and W. G. Bigelow. Surgery 45:223-228 (Feb.) 1959 [St. Louis].

Preliminary experiments on dogs showed that in the animals subjected to an anesthetic alone there was no alteration in platelet levels, while in hypothermic anesthetized dogs the fall of platelets averaged 63% of the normal count. The greatest fall occurred at the lowest temperatures reached. In dogs which were cooled, anesthetized, and given heparin in doses ranging from 0.5 to 1 mg. per kilogram of body weight, the fall of platelets averaged 41% of the normal count. No hemorrhage was noted in either the heparinized or the nonheparinized animals.

The influence of heparin on hypothermic thrombocytopenia was tested in 12 consecutive adult patients undergoing hypothermia for open heart surgery, chiefly the repair of atrial septal defects. The first 6 of the 12 patients received no heparin before the induction of hypothermia. The second 6 patients received 15 to 20 mg. of heparin intravenously before the induction of hypothermia. Platelet counts were taken before the induction at 35 C (95 F), and at 5-degree intervals thereafter on cooling and rewarming. In the 6 patients who did not receive heparin before the induction, the platelet fall averaged 46%. One of these patients showed a pronounced hemorrhagic tendency which was controlled. This was the patient with the lowest platelet count. The 6 patients who received heparin before the induction and who underwent subsequent hypothermia had an average platelet fall of only 19%. This difference is statistically significant. No hemorrhagic tendencies were noted in this group. Before the use of small doses of heparin routinely in hypothermia, hemorrhagic tendencies were noted in 3 of 14 patients. One of these patients died within 12 hours of operation. At autopsy a large mediastinal hematoma and hemothorax were found. In 10 consecutive patients in whom small doses of heparin were used to modify the hypothermic thrombocytopenia, there was no hemorrhagic tendency or uncontrollable oozing.

In this small series of patients the use of heparin thus has minimized thrombocytopenia and has eliminated bleeding tendencies. The authors feel that heparin minimizes thrombocytopenia only if given just before cooling. It will not increase the number of circulating platelets in a patient already hypothermic. Presumably heparin acts by reducing the adhesiveness or agglutinability of platelets below a critical level.

PHYSIOLOGY

On the Placental Transfer of Vitamin C: An Experimental Study on Guinea Pigs and Human Subjects. N. Räihä. Acta physiol. scandinav. (supp. 155) 45:1-53, 1958 (In English) [Stockholm].

The process of transfer of vitamin C across the placental barrier from mother to fetus was studied in guinea pigs and in human subjects. Specimens of maternal blood, cord blood, and amniotic fluid from 9 cases of legal abortion performed at Södra Barnbördshuset in Stockholm, and from 41 normal deliveries at the Women's Clinic of the University of Helsinki, were studied. Experiments on human subjects were performed as follows. The umbilical cord was cautiously exposed by a vaginal hysterotomy made on the mother with the aid of ether anesthesia. In 3 women, initial blood samples were drawn from the umbilical vein and from the left antecubital vein, and immediately injections of 1 Gm., 1 Gm., and 1.5 Gm., respectively, of L-ascorbic acid were made into the right antecubital vein. Maternal and fetal blood samples were collected after 3, 6, and 15 minutes respectively. In 4 women, the L-ascorbic acid solution was injected into the maternal circulation some time before the exposure of and blood sampling from the umbilical cord. In vitro studies on the passage of L-ascorbic acid and dehydroascorbic acid from plasma to erythrocytes were made from adult and fetal blood in order to clarify the in vivo experiments on placental transfer. The in vitro permeability of adult and fetal human erythrocytes to dehydroascorbic acid was studied in venous blood samples from healthy adults and from the cord blood obtained during 4 normal deliveries.

The in vitro results showed that, after an addition of L-ascorbic acid to adult and fetal blood, nearly all the added vitamin remained in the plasma, and only a very slight increase of the total ascorbic acid content was found in the erythrocytes. After additions of dehydroascorbic acid to adult and fetal human blood, a marked increase of total ascorbic acid content was found in the erythrocytes, and only a slight increase was observed in the plasma. The permeation of dehydroascorbic acid into adult and fetal human erythrocytes occurred at equal rates. In the studies of blood samples of maternal and cord blood obtained in the course of legal abortions and normal deliveries, it was found that all the fetal blood samples contained more total ascorbic acid (mean, 2.01 mg. per 100 cc.) than the maternal blood (mean, 1.24 mg. per 100 cc.). Dehydroascorbic acid was distributed more equally (mean in fetal plasma, 0.40 mg. per 100 cc. and in maternal plasma, 0.38 mg. per 100 cc.) on both sides of the placenta, whereas the fetal plasma contained more L-ascorbic acid (mean, 1.06 mg. per 100 cc.) than the maternal plasma (mean, 0.40 mg. per 100 cc.). Studies relating the total ascorbic content of the amniotic fluid to that of maternal and fetal plasma showed that, when the total ascorbic acid content of the maternal plasma exceeded the mean normal value of 0.60 mg. per 100 cc., an accumulation of total ascorbic acid was found in the amniotic fluid; in contrast, when the fetal plasma showed values below the mean normal value of 1.20 mg. per 100 cc., the amniotic fluid contained an even lower total ascorbic acid concentration. Experimental studies in which L-ascorbic acid was injected into the mother, and samples of blood were taken from the umbilical cord during legal abortion, showed a slight but distinct increase of total ascorbic acid in the fetal plasma.

These findings indicate that the transfer of vitamin C across the placenta most probably occurs as dehydroascorbic acid, and that the high content of vitamin C in the fetal blood is due to an increase in the concentration of L-ascorbic acid on the fetal side of the placenta. This mechanism of transfer would make it possible for the fetus to maintain a high concentration of vitamin C.

Studies on the Renal Concentrating Mechanism: III. Effect of Heavy Exercise. L. G. Raisz, W. Y. W. Au and R. L. Scheer. J. Clin. Invest. 38:8-13 (Jan., pt. 1) 1959 [New York].

Earlier investigations had demonstrated that heavy exercise decreases urine flow, sodium excretion, glomerular filtration rate, and effective renal blood flow in man. In addition, albumin, casts, and red blood cells were often found in the urine sediment after exercise. Since the renal concentrating ability is a sensitive measure of renal impairment, the present study was undertaken to determine the effect of exercise on this function. The subjects were 6 medical students and 2 physicians. The medical students were selected for their ability to pass the "bladder emptying test," that is, they were able to void small volumes of urine so that catheterization could be avoided. The subjects took no fluid after lunch of the day prior to the experiment and at a dry supper. The heavy exercise consisted of stair running or of stepping up and down a 17-in. step every 3 seconds. Both these exercises were continued for 30 minutes. The exercises were made first without solute loading. Then they were made during solute loading after a small osmotic diuresis, which was established by the infusion of 5% mannitol in 0.36% saline solution at a rate of 3.6 to 3.9 ml. per minute for 2 hours prior to exercise. Vasopressin was added. A third series of heavy exercise was carried out after a large osmotic diuresis, which was established by the infusion of 5% mannitol in 0.36% saline at 18 to 20 ml. per minute for 90 minutes prior to exercise. Vasopressin was again added.

It was found that heavy exercise led to impairment of the concentrating ability in hydropenic normal men. This impairment was observed in experiments without solute loading and also during a small osmotic diuresis but not during a large osmotic diuresis. The effect could not be prevented by the administration of vasopressin and is, therefore, considered not to be the consequence of a decrease in endogenous antidiuretic hormone production. During a large mannitol diuresis there was no distinct change in concentrating ability or in creatinine and mannitol clearance with exercise. In all 3 groups exercise caused an abrupt decrease in total solute excretion and particularly in sodium excretion.

Motor Unit Territory in Different Human Muscles. F. Buchthal, F. Erminio and P. Rosenfalck. Acta physiol. scandinav. 45:72-87 (no. 1) 1959 (In English) [Stockholm].

Since the territory of a motor unit in human muscles is not accessible to investigation by histological techniques, the authors had previously determined the disposition of the fibers of such a unit by mapping the cross sectional distribution of its action potentials. In the human brachial biceps the fibers of a motor unit were found to be confined to a relatively small area of the total cross section of the muscle. The studies described here aimed to determine to what extent these findings apply to other muscles. In addition, the concentration of muscle fibers within the motor units in different muscles is inferred from the maximum voltage within the motor units. A multielectrode with 12 leads, inserted perpendicularly to the direction of the fibers, recorded from all fibers of a motor unit along its track. The depth of insertion was adjusted to record the potential of maximum voltage on one of the center leads. Whenever possible, insertions were made both anteroposteriorly and mediolaterally. For selection of a lead suitable as indifferent electrode, the potential was recorded between leads 1 and 12, with lead 12 as indifferent electrode. The lead which recorded the potential of highest voltage was kept in constant connection with the electromyograph.

Studies were made in 62 subjects on the following muscles: biceps brachii, deltoideus, extensor digitorum communis, opponens pollicis, rectus femoris, biceps femoris, tibialis anterior, and extensor digitorum brevis; the total number of muscles studied was 79. Potentials containing a steep deflection with a duration of less than 0.2 milliseconds (denoted as spike) were recorded on 3 to 6 leads corresponding to 4 to 10 mm. of the cross section of the muscle. The area over which the action potentials of a motor unit contained spike components was used as a gauge of the territory over which the fibers of the motor unit were distributed, since a spike signals the presence of active muscle fibers in the immediate vicinity of the lead. Thus, in the brachial biceps the muscle fibers giving rise to a spike potential of 50 microvolts are at a distance of less than 1 mm. from the recording lead. In the majority of muscles investigated, the voltage level at which spikes appeared in the action potentials was 50 to 100 microvolts. In the m. opponens pollicis and m. biceps femoris the spike level was 150 microvolts, and in the m. extensor digitorum brevis it was 200 microvolts.

The fibers of a motor unit were found to be confined to a circular area of 5 to 7 mm. in diameter for the muscles of the upper extremities and of 7 to 10 mm. in the lower extremities. Such areas allow space for the fibers of 25 motor units, each comprising 500 to 2,000 fibers. Within the same muscle, or the same type of muscle, the diameter of the motor unit territory varied by a factor of 4. The maximum voltage within the motor unit increased linearly with the territory. The different average values of maximum voltage and territory in different muscles are interpreted in terms of differences in fiber concentration and total number of fibers per motor unit.

BOOK REVIEWS

Hormones and Atherosclerosis. Proceedings of the Conference Held in Brighton, Utah, March 11-14, 1958. Edited by Gregory Pincus. Organizing Committee: Marshall E. Groover and others. Cloth. $13.50. Pp. 484, with illustrations. Academic Press, Inc., 111 Fifth Ave., New York 3, 1959.

This well-indexed volume contains the proceedings of a conference sponsored by the Endocrine Study Section of the National Institutes of Health on hormonal interaction with the atherosclerotic process. The participants, who represented several disciplines, from test-tube chemist to epidemiologist, succeeded in giving the depth of focus this important subject deserves. The spirited discussions were often more elucidating than the prepared presentations. The proceedings were concerned with (1) cholesterol metabolism and hormonal influence thereon; (2) lipogenesis and lipid transport, their hormonal control and their relationship to atherosclerosis; (3) the influence of various hormones on experimental atherosclerosis; (4) the relationships of blood lipids and the endocrine state in animals and man; and (5) certain clinical aspects related to the endocrine influence on human atherosclerosis. This volume is not a review, as the contributions often represent a report on work in progress rather than a statement of progress. The multidisciplinary approach should provide a point of entry for the student, the investigator concerned with a narrow aspect of this broad problem, and the thoughtful clinician who is not satisfied with the facile explanations that are often used to support current therapeutic approaches. In general, the reader will find no ready answers to the vexing problems posed by the conferees but rather a rich source of research leads.

Management of the Newborn. By Arthur Hawley Parmelee, M.D., Clinical Professor of Pediatrics, University of Southern California School of Medicine, Los Angeles. Second edition. Cloth. $8.50. Pp. 368, with 47 illustrations. Year Book Publishers, Inc., 200 E. Illinois St., Chicago 11, 1959.

The new edition of this book has not changed the impression created by the excellent first edition. The chapters on streptococcic infections in the newborn, retrolental fibroplasia, hyaline membrane syndrome, and resuscitation of the newborn and infants of diabetic mothers have been rewritten and covered very well. The author has had extensive experience with newborn infants, and he covers the subject in a practical manner extremely well. It is highly recommended to obstetricians, pediatricians, and general practitioners.

Medical Department, United States Army: Surgery in World War II. Neurosurgery. Volume I. Prepared and published under direction of Major General S. B. Hays, Surgeon General, U. S. Army. Editor in chief: Colonel John Boyd Coates Jr. Editors for neurosurgery: R. Glen Spurling, M.D., and Barnes Woodhall, M.D. Associate editor: Elizabeth M. McFetridge, M.A. Office of Surgeon General, Department of Army, Washington, D. C. Cloth. $5. Pp. 466, with illustrations. Superintendent of Documents, Government Printing Office, Washington 25, D. C., 1958.

This is the first of two volumes on neurosurgery in World War II. Part 1 tells the story of the development of neurosurgical centers in the continental United States and overseas theaters of operations. Part 2 describes the management of head injuries. Outstanding advances in this field included cranioplasty with use of tantalum plates, the treatment of speech defects, and the management of posttraumatic epilepsy. The appendixes deal with (1) courses of instruction in neurosurgery, (2) extracts from the Manual of Therapy of the European Theater of Operations, (3) special history and examination forms, and (4) battle wounds of the head and brain. This should prove to be a valuable reference book for neurosurgeons, especially those in the military service. The book is well written and illustrated and is printed on paper of a high quality. There is an index.

Gynecologic Radiography. By Jean Dalsace, M.D., Chief of Sterility Clinic, Broca Hospital, University of Paris, Paris, and J. Garcia-Calderón, M.D., Radiologist, University of Paris School of Medicine. With chapter on Radiography of the Breast by Charles-M. Gros, M.D., and Robert Sigrist, M.D. Foreword by I. C. Rubin, M.D. Translated by Hans Lehfeldt, M.D. Cloth. $8. Pp. 188, with 305 illustrations. Paul B. Hoeber, Inc. (medical book department of Harper & Brothers), 49 E. 33rd St., New York 16, 1959.

This is an excellent atlas of hysterography and hysterosalpingography. The illustrations are accompanied by clearly stated, descriptive explanatory notes. The first three chapters discuss phases of technique, incidents, and accidents to be considered in the course of hysterography and hysterosalpingography. The radiographic reproductions are of a high quality, but the use of both positive and negative reproductions is confusing. This is probably the first atlas in its field to be made available to American readers. Dr. I. C. Rubin in his foreword says: "From an abundant number of cases thus studied the authors have achieved an experience culminating in a high degree of diagnostic accuracy. This experience they have imparted to the reader of the atlas by presenting clear cut radiographs with terse descriptions implemented by the specific anatomic and path-

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These book reviews have been prepared by competent authorities but do not represent the opinions of any medical or other organization unless specifically so stated.

ologic findings to clarify the salient points." In discussion of techniques the authors emphasize fluoroscopic control of filling plus serial films and variable postural projections. With the current concern about cumulative radiation hazards it would seem wise to emphasize the necessity for careful selection of cases; in each instance these procedures must be fully justified. The chapter on radiography of the breast deals with techniques and limitations of interpretation. It should prove a stimulant to greater application of this diagnostic procedure. The clarity of the radiographic reproductions shows that with improved technique and experience the procedure can add much to the detection of early malignancy.

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This textbook was written primarily for teaching at the undergraduate level and should have been called "An Introduction to Oral Diagnosis." The authors are well acquainted with the needs and level of understanding of students, the desirability of easy reading, and the necessity to present material in a logical sequence. Most texts on oral diagnosis aim at a seller's market rather than a specific goal, i. e., an attempt is made to write a book basic enough for undergraduate use and yet comprehensive enough to be used as a reference text for men in active practice. This book is unique in that it is basic enough to be of value to students without confusing them with too many details or theoretical tangents. It should be supplemented with a text on oral medicine since many signs and symptoms of systemic diseases have early manifestations in the oral cavity, but as it is not this remains a phase in which this book is exceptionally weak.

The Chemistry of Industrial Toxicology. By Hervey B. Elkins, Director, Division of Occupational Hygiene, Massachusetts Department of Labor and Industries, Boston. Second edition. Cloth. $11.50. Pp. 452, with 26 illustrations. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16; Chapman & Hall, Ltd., 37-39 Essex St., Strand, London, W. C. 2, England, 1959.

In this new edition the author retains the general plan of the earlier edition and includes discussions of new developments in the field of toxicology. Hazards which are a potential menace to the health of the industrial worker are an ever-increasing problem. Attention is directed toward the more dangerous substances which include many organic compounds, especially pesticides, and some inorganic materials. The most important have been the radioactive isotopes. New analytical methods have been developed over the past decade, with particular emphasis on the analysis of body fluids. Although the medical aspects of industrial toxicology are obviously of great importance, this book seeks to outline those aspects which are the primary concern of the chemist, engineer, and factory manager.

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The Principles of Physical Education. By Jesse Feiring Williams, M.D., Sc.D. Seventh edition. Cloth. $4.50. Pp. 389, with 10 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W. C. 2, England, 1959.

For nearly half a century the author has been a potent leader and a powerful influence in shaping the direction of physical education in the United States. Physical education, as he has conceived it, is education through the physical and not merely of the physical. As such it has the same objectives as all of education, with physical activities as its tools for learning. In a democracy, natural activities, sports, and games are a better expression of national philosophy than the formal gymnastics which stem from other cultures. This new edition is a reaffirmation of these principles in the light of contemporary conditions and problems.

Consistent with his philosophy of physical education the author lists its contributions to education as development of organic systems, development of neuromuscular skills, development of interest in play and recreation, and development of standards of behavior. Each of these achieves its fullest realization only with careful selection of activities, proper facilities and conditions for learning, and professionally prepared teachers and leaders. It is not enough for such leaders to be skillful perform-ers; they must have a thorough understanding of the child's growth and development, a proper background in the physiology of muscular activity, and competency in educational procedures and methods.

In discussing problems of youth fitness the author fortunately dispels the delusion that physical education might somehow cut down the rate of rejections from selective service. The causes of rejection, whether for physical or mental deficiencies, have only a remote relationship to physical education. The author might have added that the standards used by the armed services are arbitrary, subject to change, and a measure of capacity to serve rather than of health. Only a comparatively small proportion of the causes of rejection—an estimated 20%—are subject to prevention or correction by any known medical means.

After a consideration of the relationship of physical education to education and to democracy, the nature of man is discussed in terms of biological and psychological foundations. Much attention is given to curriculum construction and principles of method, guidance, and administration in physical education. Finally there is a summary of the process of appraising the results of physical education. The volume constitutes a reexamination of the role of physical education in fitting the individual to become a worthy member of society. This new edition will take its place along with its predecessors as a classic in the field.

Developmental Psychology. By Elizabeth B. Hurlock, h.D., Associate in Psychology, Graduate School, University f Pennsylvania, Philadelphia. Second edition. Cloth. $6.75. p. 645, with 131 illustrations. McGraw-Hill Book Compa- y, Inc., 330 W. 42nd St., New York 36; 95 Farringdon St., London, E. C. 4, England; 253 Spadina Rd., Toronto 4, Canada, 1959.

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This volume stresses management, first in a general and then in a specific way. The expression "long-term illness" has been substituted for chronic illness without the realization that the two terms may not be synonymous. The phrase fits in well, however, with the modern concept of hospitalization which has the patients flowing into the sections of the hospital which can best serve their needs. The book is well organized and presents timely information for the practitioner who is still a student. This is especially true in the discussion of the psychological problem of and nursing procedures in the care of the chronically ill. The considerations taken up in this section are basic to the management of the specific diseases discussed in part two. In this part the management of most long-term illnesses is discussed specifically. In some areas of this section the treatment suggested seems to proceed almost too quickly to the more severe and complicated procedures. More recent graduates may not realize that some chronic states may best be treated by studied neglect, at least for a time.

Handbuch der Orthopädie. In vier Bänden. Herausgegeben von Prof. Dr. G. Hohmann, Prof. Dr. M. Hackenbroch, Direktor der Orthopädischen Universitätsklinik Köln, und Prof. Dr. K. Lindemann, Direktor der Orthopädischen Universitätsklinik Heidelberg-Schlierbach. **Band II: Spezielle Orthopädie: Rumpf (Wirbelsäule und Becken).** Bearbeitet von R. Bernbeck et al. Cloth. 174 marks; $41.45. Pp. 1136, with 846 illustrations. Georg Thieme Verlag, Herdweg 63, (14a) Stuttgart, West Germany; [Intercontinental Medical Book Corporation, 381 Fourth Ave., New York 16], 1958.

This second volume in a series of four is devoted to surgery of the spinal column and pelvis. The book opens with a historical review of the subjects under discussion, and it is heartening to note that the editors are thoroughly acquainted with the surgical literature of the world. The chapters on scoliosis and tuberculosis are outstanding, as are the chapters on trauma and neurological disturbances due to spinal diseases. There is a wealth of information in this part of the work, and the author of each chapter is highly competent. The chapter on scoliosis by Lindemann contains practically everything one needs to know about the history, pathology, and treatment of this condition. The treatment is highlighted by the work of such North American surgeons as Risser and Cobb. It is stated, "Early surgery is indicated in scoliosis, but the prognosis is unfavorable." To this should be added that it is most difficult to predict the outcome of operation in these instances.

The chapter on tuberculosis suggests differences in the treatment as carried out in Germany and in the United States—spinal fusion in childhood is considered contraindicated by most German surgeons, while it is recommended in the United States. The use of a posterior plaster shell in lordosis is emphasized in Germany, while in the United States a vertebral collapse is considered essential in the early healing of the lesion. A great deal of effort has been expended by the authors to bring this work up to date. It is thorough and authoritative. Every orthopedic surgeon should have this highly recommended work in his library.

Radioactive Isotopes in Clinical Practice. By Edith H. Quimby, Sc.D., Professor of Radiology (Physics), College of Physicians and Surgeons, Columbia University, New York, Sergei Feitelberg, M.D., Associate Clinical Professor of Radiology, College of Physicians and Surgeons, Columbia University, and Solomon Silver, M.D., Associate Clinical Professor of Medicine, College of Physicians and Surgeons, Columbia University. Cloth. $10. Pp. 451, with 97 illustrations. Lea & Febiger, 600 S. Washington Sq., Philadelphia 6, 1958.

This book is an introduction to the relatively new field of nuclear medicine. During the past five years the authors have conducted a comprehensive course in the clinical uses of radioactive isotopes. It is from the experience gained in the presentation of this course that this book has been written. The first section, Basic Physics, is written by Dr. Quimby. The basic materials of atomic and nuclear physics, interaction of radiation and matter, radiation dosimetry, radiation hazards, and related subjects are presented in a succinct and integrated manner. Historical accounts of advances in the field, which the reader should find interesting and informative, are interspersed. The section by Dr. Feitelberg deals with instrumentation and laboratory methods. Radiation detectors and measuring instruments are discussed, with respect to principles of operation as well as practical use. Chapters on the quantitative measurement of isotopes in vivo, the time factor in physiological processes, measurement of the distribution of isotopes within the body, and autoradiography are included. The section concludes with chapters on the use of radiation detectors for health protection and laboratory design. The subject material is well covered, although the reader may find the author's style a bit monotonous.

The final section, Clinical Application, is written by Dr. Silver. There are many uses for radioisotopes in many fields of clinical practice. The most widely used is radioiodine in the study of thyroid function and the treatment of certain disorders of the thyroid. The author devotes much of his section to these subjects, which are discussed in a clear and logical manner. Great emphasis is placed on the physiological mechanisms involved and the various ways the radioiodine tracer may be used to elucidate these mechanisms. A valuable discussion of pitfalls in the interpretation of such tests is included. The portion covering treatment with radioiodine is equally well presented. The remainder of this section is disappointing; various commonly used tests are mentioned but no critical evaluation of their usefulness, clinical indications, or underlying physiological basis is provided. This book should be useful to persons interested in learning the various uses of radioisotopes in medicine and the physics and instrumentation involved. Persons teaching this subject at both undergraduate and postgraduate levels should find it a useful textbook and an excellent example of a course presentation that has proved successful.

QUESTIONS AND ANSWERS

PROGRESSIVE MUSCULAR ATROPHY

To the Editor:—*An 18-month-old girl was given the diagnosis of progressive muscular atrophy in October, 1958. Is there a definite difference between a hereditary and an acquired type of this disease? If so, how can this be determined? Is there a likelihood of a similar disease in any future children that this family might have? What is the earliest age at which this disease can be diagnosed? Can a 3½-year-old sibling in the same family be considered free of this disease? What is the usual life expectancy after this diagnosis has been made?*

Lloyd C. McCaskill, M.D., Maxton, N. C.

Answer.—It is probable, if the diagnosis of progressive muscular atrophy has been made in an 18-month-old child, that this patient has the Werdnig-Hoffmann type. This usually comes on during the first year of life and is progressive. It is believed to be hereditary, although sporadic cases have been described. Clinically, there is no differentiation between the hereditary and sporadic varieties. It is generally agreed by clinicians that there is a likelihood of similar disease in future children of such a family. The disease is rarely diagnosed prior to the age of 6 months. If a sibling has reached the age of 3½ years without being affected, it may be safely assumed that the child will not develop this type of muscular atrophy. The usual course of the disease is from one to three years. It is unusual for such patients to live to the age of 5 years.

BRADYCARDIA

To the Editor:—*What treatment should be given a patient who has sinus bradycardia but no physical, electrocardiographic, or roentgenographic evidence of heart disease, arteriosclerosis, or jaundice? He may have a mild hypothyroidism. His heart rate varies between 40 and 58 beats per minute. He has had a spell of faintness with weakness and sweating but no evidence of hypoglycemia. Thyroid extract, ephedrine, and amphetamine have been tried without success.*

R. J. Kent, M.D., Savannah, N. Y.

Answer.—Sinus bradycardia with a rate between 50 and 60 per minute is common in normal persons, and rates as low as 36 per minute may be found in healthy persons without symptoms of any kind. Occasionally these slow rates are accompanied by dizziness or syncope, as in the patient described. In the absence of heart disease and when other causes of bradycardia, such as myxedema, sensitivity of the carotid sinus, increased intracranial pressure, and jaundice, are excluded, reassurance is usually all that is needed. If dizziness or syncope recur without other apparent reason, 0.3 or 0.4 mg. of atropine three or four times daily, after meals, may be given as a therapeutic and prophylactic measure.

FOOTBALL AFTER SPLENECTOMY

To the Editor:—*A 21-year-old man who had a splenectomy two years ago for an injury now wishes to play football. At present, physical and neurological examinations are within normal limits except for a blood pressure of 155/90 mm. Hg in the upper extremities and 170/100 mm. Hg in the lower extremities. He is asymptomatic, and his weight is normal for his age and height. Urinalysis, blood cell count, sedimentation rate, bleeding and clotting time, platelet count, clot retraction, blood urea nitrogen level, and other findings are within normal limits. An intravenous pyelogram, roentgenogram of the chest, and electrocardiogram reveal no abnormalities. Is splenectomy a contraindication for playing football?*

Waldo Greespan, M.D., Hackensack, N. J.

Answer.—Splenectomy in normal animals does not produce any measurable change, except for the immediate effects associated with the operation. The spleen does serve as a reservoir for erythrocytes which may be added to the general circulation after rapid blood loss or similar emergencies. After the loss of the spleen, other capillary beds may hold more red blood cells for this purpose. Bollman and co-workers (*Surgery* 4:881, 1938) found that normal dogs added red blood cells from the spleen to the general circulation when anesthetized with ether. Splenectomized dogs did not add so much, and a somewhat greater reduction of total blood volume occurred in the splenectomized animals than in the normal dogs receiving ether. Many human beings have maintained active lives after splenectomy for traumatic or medical reasons. This consultant knows of no reports tending to show any deleterious sequelae that could be attributed to the absence of the spleen. A football injury should not be more complicated because of the absence of the spleen.

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any medical or other organization unless specifically so stated in the reply. Anonymous communications cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

MULTIPLE SCLEROSIS BOOK

To the Editor:—*A patient with multiple sclerosis has brought to his physician's attention the book by Jonez and Gross, "My Fight to Conquer Multiple Sclerosis" (New York, Julian Messner, Inc., 1952). Is Jonez' technique still being used at his multiple sclerosis clinic at St. Josephs Hospital, Tacoma, Wash.?*

Jacob Melnick, M.D., Brooklyn, N. Y.

Answer.—The treatment of multiple sclerosis by Jonez was essentially an application of the principles of physical medicine to the disease. There is no doubt that this form of treatment resulted in improvement in the physical status and the ability of the patient to perform, particularly in static cases. The treatment has no effect on the underlying cause of the disease, nor does it have any effect on the ultimate progress. It is believed that the techniques advised by Jonez are still being used at the multiple sclerosis clinic named.

WEIGHT OF TWINS

To the Editor:—*Twin boys weighed at birth 4,252.4 Gm. (9 lb. 6 oz.) and 3,742 Gm. (8 lb. 4 oz.) respectively. The mother was a multipara, and delivery was normal. What is the record combined weight for twins?*

Lucius D. Hill Jr., M.D., San Antonio, Texas.

Answer.—The birth of living twins with a combined weight of 8,000 Gm. or more is rare. Larger babies have been reported. Holzapfel in 1935 reported twin boys weighing 4,670 Gm. (10 lb. 5 oz.) and 4,510 Gm. (9 lb. 15 oz.). Guttmacher noted that the heaviest pair of twins in 346 sets weighed 7,680 Gm. (17 lb.). Mathieu (*Northwest Med.* 37:137, 1938) reviewed the literature on large twins rather completely and found three reports of twins with combined weights of 7,000 Gm. (15 lb. 6 oz.) or more. He notes that there are isolated reports of much larger twins in the older literature, but the authenticity of some of these may be questioned.

PERINEVIC VITILIGO

To the Editor:—*What is the treatment and the prognosis if untreated in perinevic vitiligo?*

Seymour L. Hanfling, M.D., East Orange, N. J.

Answer.—Perinevic vitiligo (halo nevus) is an innocuous and benign condition consisting of a central area of pigmentation surrounded by a depigmented area of vitiligo. The central hyperpigmentation may be a nevus or a freckle. The surrounding depigmentation is similar to the vitiligo seen elsewhere in the skin of a vitiliginous process. No treatment is necessary, but, if decided on, it consists of surgical excision. Excision should encompass the central pigmentation and, where feasible, include the area of surrounding depigmentation. If the lesion is large the entire area cannot be removed in the excision.

CARCINOMA OF THE PANCREAS

To the Editor:—*Is any form of chemotherapy or radiation therapy effective against carcinoma of the pancreas? A young man who was explored surgically was found to have an inoperable carcinoma of the pancreas.*

John D. Lynch, M.D., Manitowoc, Wis.

Answer.—There is no effective treatment for inoperable carcinoma of the pancreas. Harper, of the University of Chicago, has devised a method of irradiating the pancreas with radioisotopes placed about the organ by means of long polyethylene tubes woven around the pancreas at the time of the exploratory operation. While there have been no cures by this method, there has been some worthwhile palliation. He has written several papers describing his technique.

RECURRENT JAUNDICE

To the Editor:—*With regard to the patient described in the question on recurrent jaundice, which appeared in* The Journal, *Feb. 14, 1959, page 778, I believe that the diagnosis of obstructive jaundice was too lightly dismissed. The history revealed pain in the right upper abdominal quadrant. The direct bilirubin level was elevated. The result of the test for liver disease was essentially normal. I believe this patient had a partial obstruction of the common bile duct with a ball-valve effect. The gallstone obstruction might come from bilirubin calculi, secondary to a hemolytic jaundice, but obstruction was present nevertheless. Cholecystograms are diagnostic in about 85% of the cases, and any internist can recall several patients with a normal cholecystogram and stones found at operation. An intravenous cholangiogram should be done on this patient, but even if this should prove negative an exploration should be performed.*

Louis Pelner, M.D.
1352 Carroll St.
Brooklyn 13, N. Y.

The above comment was referred to the consultant who answered the original question, and his reply follows.—Ed.

To the Editor:—*This is a difficult problem and one that cannot be categorically answered on the basis of the stated evidence. It is true that pain or distress was present in the right upper quadrant, but this is not an uncommon complaint in patients with recurrent hepatitis. It is also true that the direct bilirubin level was elevated on one occasion, but it was normal on the other. Again, however, this is consistent with recurrent hepatitis. This consultant believes that the critical findings in this patient were those of splenomegaly. This is not seen in patients with obstructive jaundice unless the obstruction has been present long enough to produce moderately se-*

vere liver damage. Finally, the absence of an elevated alkaline phosphatase level speaks strongly against obstruction. On the other hand, it is not thought that one can be certain of the diagnosis in this case. The findings were confusing and did not fit any definite diagnosis in a clear-cut way. An intravenous cholangiogram might provide evidence of obstruction. If further study and liver biopsy fail to establish a diagnosis, then certainly surgical exploration is justified. One could argue with merit that surgical exploration with liver biopsy and probably with common duct exploration is justifiable now. Even if obstruction seems to be unlikely, it must be remembered that this is a condition that can be corrected and that, if it is allowed to persist, permanent liver damage will ultimately result.

CELIAC DISEASE SYNDROME

To the Editor:—*In regard to the question on celiac disease syndrome, which appeared in* The Journal, *Jan. 10, 1959, page 202, the consultant's reply seemed incomplete. It must be admitted that the question did not supply enough data for adequate appraisal of the situation, but I believe the inquirer (whose patient was a 2-year-old child with "celiac disease syndrome," nasal discharge, and frequent infections) should have been advised to consider the possibility of agammaglobulinemia. Agammaglobulinemia is a sufficiently new disease for surprises still to occur, and one must keep an open mind in thinking about it. Frequent infection in a young child (usually male) is the most common presenting complaint. Intestinal disturbances having much in common with sprue or celiac disease have been noted in many adults with acquired agammaglobulinemia and yet may be found in children. There is no need to dwell on the importance of thinking of a rare disease for which specific diagnostic and therapeutic measures are available. If these are not available to the inquiring physician in this case, appropriate tests could be performed if he wishes to submit a sample of serum to the National Heart Institute, Bethesda 14, Md.*

Robert S. Gordon Jr., M.D.
3915 Prospect St.
Kensington, Md.

The above comment was referred to the consultant who answered the original question, and his reply follows.—Ed.

To the Editor:—*The above criticism seems to be quite proper. Congenital agammaglobulinemia, a rare, recently described syndrome, should have been included in the differential diagnosis. It is diagnosed by testing the patient's serum for the gamma globulin level. These patients have a complete inability to synthesize gamma globulin. Soon after the age of 6 months they have severe and repeated bacterial infections, because their maternal supply of gamma globulin becomes exhausted. In acquired hypogammaglobulinemia, the syndrome may result from repeated severe and prolonged infections that are not necessarily, per se, the cause of the syndrome. Many well-equipped laboratories estimate the gamma globulin level; 10 ml. of freshly drawn blood or 5 ml. of serum is needed. These patients require repeated intramuscular maintenance doses of gamma globulin (100 to 150 ml. per kilogram of body weight every two to four weeks).*

CARBON MONOXIDE AND NERVE DEAFNESS

To the Editor:—*A question concerning a possible relationship between carbon monoxide poisoning and nerve deafness appeared in* The Journal, *Jan. 3, 1959, page 163. In his answer, the consultant stated, "Practically all toxicologists believe there is no such condition as the expression 'chronic carbon monoxide poisoning' would imply." It would be appreciated if the consultant would reconcile this statement with that of Katz: "Our experience during the past three years indicates that illness arising out of chronic exposure to CO is by no means rare"* (Canad. M. A. J. *78:182, 1958). Katz reviews, in this report, 41 cases of chronic carbon monoxide poisoning. A pamphlet entitled "Carbon Monoxide" (Occupational Health Division, Department of National Health and Welfare, Ottawa, Canada) contains a brief description of an entity designated as "chronic poisoning." It is important to arrive at a generally accepted understanding in this matter, because apparently some compensation boards will now accept claims for illness arising out of exposure to carbon monoxide on the job.*

George X. Trimble, M.D.
Seaside Memorial Hospital
Long Beach 13, Calif.

To the Editor:—*In the Jan. 3, 1959, issue of* The Journal, *page 163, there appears an inquiry concerning carbon monoxide and nerve deafness. The consultant correctly stated that he could find no evidence in the American literature to suggest that carbon monoxide produced nerve deafness. His final statement that "it is logical to assume that there exists no relationship between nerve deafness and carbon monoxide exposure" is perhaps not entirely justified in view of the extensive literature, particularly from Scandinavia. A monograph entitled "Hearing Deficiencies Caused by Carbon Monoxide," by Dr. J. S. Lumio, was published in Helsinki, Finland, in 1948 (for an abbreviated version, see* Acta oto-laryng., *supp. 71, p. 1, 1948). There also is an extensive monograph on chronic carbon monoxide poisoning by Dr. Aage Grut of Denmark, in which various clinical conditions, including im-*

paired hearing, are described. Having personally visited the laboratories in which much of this work was done, I have no reason to believe that the reliability of the reports is on a lower level than that covering work done in leading American institutions. I believe that the existence of permanent injury due to chronic carbon monoxide exposure can no longer be denied, even though experience in the United States has not revealed any such cases.

Leonard J. Goldwater, M.D.
600 W. 168th St.
New York 32.

The above comments were referred to the consultant who answered the original question, and his reply follows.—Ed.

To the Editor:—*Although carbon monoxide is the oldest known noxious gas, certain aspects of its toxicity remain controversial. It is difficult to understand why this should be unless certain factors are evaluated. Medical literature is prone to perpetuate unfounded as well as substantiated opinion. The more hoary the syndrome, the more prolific is the literature related to it—a situation which presents difficulties when one attempts to differentiate statements that possess authority from those that lack authority. The abstracting system, widely in vogue, will summarize an article and pass it on to the reader even though the abstractor may know little about the subject or fail to recognize errors in the original manuscript or text. This observation most certainly applies to chronic carbon monoxide intoxication. Then, too, carbon monoxide gas is ubiquitous. Therefore, observations as to its toxicity have been recorded in many languages under varying circumstances, a situation which gives rise to a diversity of opinion. Too seldom is it appreciated that the incomplete combustion of carbon may, and often does, give rise to other hydrocarbon gases.*

The preceding paragraph serves to preface the following discussion, which is confined to a consideration of that condition often inappropriately termed "chronic carbon monoxide poisoning." No consideration will be given to the multiple, bizarre effects resulting from acute carbon monoxide anoxia. The controversy over the effects of repeated exposure to minimal concentrations of this gas arise at frequent intervals and must, at such times, be considered in the light of existing knowledge. Some months ago the editor of The Journal *received this question: "Under what circumstance does carbon monoxide poisoning result in nerve deafness?" The answer stated, in essence, that practically all toxicologists believe there is no such condition as the expression chronic carbon monoxide poisoning would imply and that no evidence that exposure to carbon monoxide produced nerve deafness could be found in the American literature.*

*The observations of Lumio referred to in the comment were made on the people of northern Finland who, during the World War II years, were deprived of liquid fuels. Their recourse was to carbon monoxide generators with charcoal used as the basic fuel. From such generators would come carbon monoxide and, in addition, could come certain nitrogenous compounds, as well as other hydrocarbons. Lumio's work dealt at some length with dizziness, giddiness, headache, and aspects of vestibular and cochlear dysfunction. In a more recent article (*Arch. Gewerbepath. u. Gewerbehyg. **13:***139; 1954), he has concluded that findings in such situations are not completely diagnostic. Further reference could be made to the monograph of Dr. Aage Grut and to one or two others to be found in the foreign literature. It is not the intent of this consultant to discredit their observations. It can only be reiterated that a diversity of opinion arises out of varying circumstances which are not fully comprehended without first-hand observation. For several years, a Committee of the Council on Industrial Health of the American Medical Association and the Committee on the Conservation of Hearing Loss of the American Academy of Ophthalmology and Otolaryngology have studied hearing loss among the industrial workers in America. Admittedly their chief concern has been the noise problem, yet a hearing loss due to constant exposure to carbon monoxide has not been called to their attention.*

Carbon monoxide is a by-product of innumerable processes in industry and has been since the beginning of American industry. If there were an incidence of hearing loss due to exposure to this gas, it would not have escaped the attention of the industrial toxicologists or hygienists. The title of the article by Katz, "Carbon Monoxide Asphyxia, a Common Clinical Entity," is somewhat misleading, in that the author presented only one case, that of a patient with acute intoxication. The rest of the paper dealt with minute, daily exposures. Much misunderstanding arises out of the word "chronic" as applied to carbon monoxide exposure. A chronic disease is "a disease of long duration" (Webster). No toxicologist would deny that daily exposure to minimal amounts of carbon monoxide may produce temporary headache, dizziness, fatigue, or even drowsiness, along with other minor disturbances. These are not caused by permanent pathological changes and clear up after removal from exposure. There is adequate testimony in the literature that carbon monoxide is not cumulative.

WASHINGTON NEWS

Senators Asked for More Research Spending . .
President Names 130 to Aging Advisory Panel . .
Medicare Funds Clear House . .
Arthritis Drugs Slated for Study . .
Senate Hearings on Aging Charted . .

SENATORS URGED TO BOOST MEDICAL RESEARCH FUNDS FURTHER

Scores of witnesses appeared before a Senate Appropriations subcommittee to advocate sharply increased spending on federal medical research programs.

The subcommittee, headed by Sen. Lister Hill (D., Ala.), is considering a House-passed measure granting the National Institutes of Health 344 million dollars for the fiscal year starting July 1, an increase of 50 million dollars over the administration request.

Although Arthur S. Flemming, Secretary of Health, Education and Welfare, said the Senate should try to keep spending for the NIH in check, most of the witnesses urged even higher outlays than voted by the House.

Sen. Hill said that at least 110 million dollars should be spent on cancer research alone in memory of the late John Foster Dulles. The House approved 83 million dollars and President Eisenhower recommended 75 million dollars.

Sen. Richard M. Neuberger (D., Ore.) proposed a long-range 500-million-dollar cancer research program, more than the 344 million dollars the House approved for all of the NIH's operations next fiscal year.

Dr. Isadore S. Ravdin, chief consultant physician to President Eisenhower during his ileitis illness, and Dr. Sidney Farber, of the Harvard Medical School, both labeled the administration's cancer research budget inadequate. Dr. Farber said at least 110 million dollars is needed to exploit gains already made.

Dr. Walter Bauer, medical services chief of Massachusetts General Hospital, said the Senate should appropriate 134 million dollars more for the NIH than the House. He told the subcommittee it was "foolish" for the administration to talk about a balanced budget when an unbalanced one "would help make Americans healthy and strong."

CITIZENS APPOINTED TO ADVISORY COMMITTEE FOR AGING CONFERENCE

President Eisenhower named 130 citizens, including 13 physicians, to serve on the National Advisory Committee for the White House Conference on the Aging. The conference, to be held in January, 1961, will consider all problems of the nation's aging population—financial, medical, recreational, and from the aspects of social and civic participation and housing.

The advisory committee represents all segments of the population—the medical and legal professions, business, labor, agriculture, and public and private organizations concerned with the aging. Head of the group is Robert W. Kean of New Jersey, who served for many years as a Republican member of the House of Representatives.

Arthur S. Flemming, Secretary of Health, Education and Welfare, declared that the conference will be "one of the most important and significant undertakings of our society today because it is concerned with a most vital area of American life.

"A total national effort will be required to assure the success of our mission to make the added years of life for our fellow citizens more comfortable, useful and meaningful," he said.

The 13 physicians named to the advisory committee are:

Dr. Edward L. Bortz of Cynwyd, Pa., a past-president of the American Medical Association and now president of the medical staff at Lankenau Hospital in Philadelphia.

Dr. Berwyn F. Mattison, Tarrytown, N. Y., executive secretary of the American Public Health Association.

Dr. Howard A. Rusk, Scarsdale, N. Y., director of the Institute of Rehabilitation and Physical Medicine, Bellevue Medical Center, New York, and chairman of the Department of Physical Medicine and Rehabilitation at the New York University College of Medicine.

Dr. Ewald W. Busse, chairman of the Department of Psychiatry, Duke University Medical School, Durham, N. C.

Dr. Will E. Neal, Huntington, W. Va., Republican congressman for two terms.

Dr. Edwin L. Crosby, Winnetka, Ill., director of the American Hospital Association, Chicago.

Dr. Walter U. Kennedy, Newcastle, Ind., president of the Henry County (Ind.) Welfare Board.

Dr. Frederick C. Swartz, East Lansing, Mich., Chairman of the Committee on Aging of the AMA.

Dr. William B. Kountz, St. Louis, assistant professor of Clinical Medicine at the Washington University (St. Louis) School of Medicine.

Dr. Leonard W. Larson, Bismarck, N. D., Chairman of the Board of Trustees of the AMA.

Dr. Hayden H. Donahue, Oklahoma City, director of the Oklahoma Department of Mental Health.

Dr. Norman R. Sloan, Honolulu, chief of the Bureau of Geriatrics of the Hawaii Department of Health.

Dr. Cecil G. Sheps, general director of the Beth Israel Hospital in Boston and clinical professor in preventive medicine at Harvard Medical School.

(Continued on next page)

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Riseman, J. E. F., *et al.*: Circulation *17*:22, 1958

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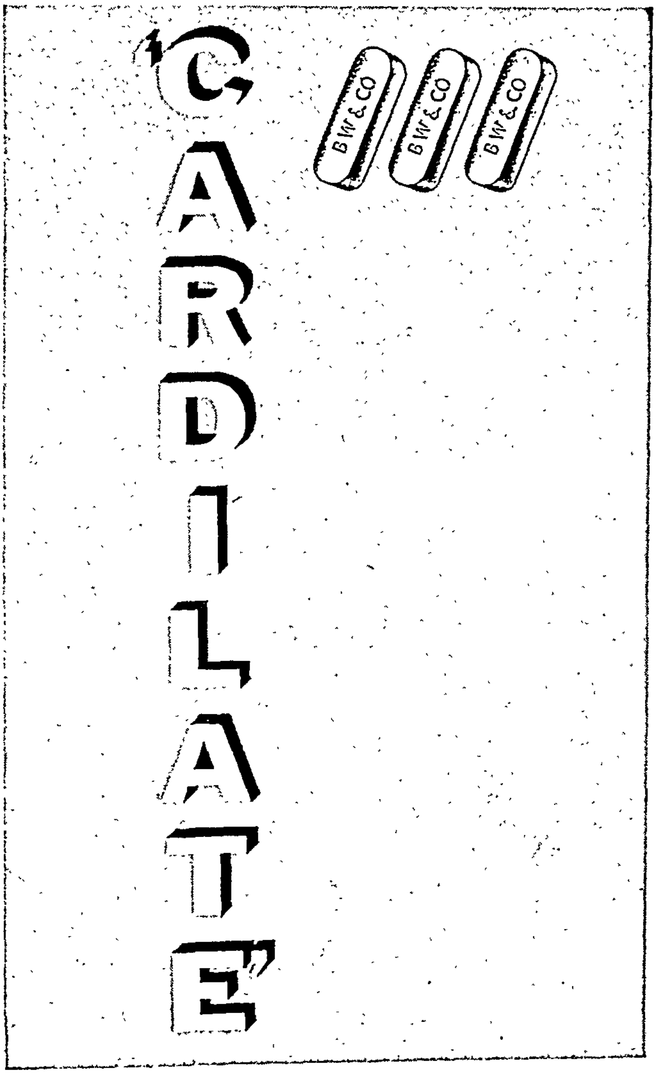


Other prominent persons appointed include G. Warfield Hobbs, chairman of the National Committee on Aging of the National Social Welfare Assembly; Charles I. Schottland, former Social Security Administrator; Thomas C. Desmond, former chairman of the New York State Joint Legislative Committee on Problems of the Aging; Nelson H. Cruikshank, director of the AFL-CIO Department of Social Security; Gen. Alfred M. Gruenther, president of the American Red Cross, Karl Schlotterbeck, director of the Economic Security Program of the U. S. Chamber of Commerce; Mrs. Florence L. Baltz, president of the American Nursing Home Association, and Mrs. Buddy Rogers, (Mary Pickford), former movie star.

HOUSE APPROVES MEDICARE FUNDS

The House voted to give the administration the full $88,800,000 it sought to run the Defense Department's Medicare program in the fiscal year starting July 1. Although the total is about 5 million dollars less than the estimated $94,400,000 the program will cost this fiscal year, it is considerably more than the suggested 60-million-dollar level advanced by the House Appropriations Committee last year.

Medicare authorizes treatment in civilian hospitals of qualified dependents of members of the Armed Forces.

The Appropriations Committee, in approving the $88,800,000 as part of the over-all 38.8-billion-dollar defense budget, said in a report that the Defense Department "is to be commended for its response to the intent of Congress in the program." The group noted that it slashed money for Medicare last year, causing restrictions that were put into effect too late to have a major impact on spending this fiscal year.

The praise came in contrast to the criticism the same committee levelled at the department only a few months ago. Acting on an emergency appropriations bill the lawmakers said they were "concerned with the high costs of care for military personnel and their dependents in civilian hospitals and the high fees allowed in the program." There was no mention of fees in the latest report.

The committee again urged that dependents of military personnel use military hospitals whenever possible rather than private hospitals. "There are no doubt some shortcomings in the service provided by military hospitals, but the committee does not feel that the problem can be solved by deserting the military facilities and adding to the already heavy burden on civilian hospital facilities."

There was some speculation earlier this year that Congress might make deep cuts in the Medicare program, but the House vote apparently ruled this out.

The Appropriations Committee declared that the Defense Department is studying Medicare, "and it is hoped that steps can ultimately be taken which may further reduce the costs of the dependents' medical care program without depriving the dependents of the benefits which the Congress wishes them to have."

ARTHRITIS DRUG STUDY ANNOUNCED

The Public Health Service and nine clinical centers across the country plan to start a study of 200 arthritis and rheumatism victims next fall to determine the value of drugs in combating the ailments. The study will be financed by PHS and the Arthritis and Rheumatism Foundation at an estimated cost of $35,000 to $50,000 a year.

Dr. Joseph J. Bunim of the National Institutes of Health, President of the American Rheumatism Association, said objective tests of various drugs used in treatment of these diseases are urgently needed now as the first step in a broader study of the ailments.

In addition to the PHS National Institute of Arthritis and Metabolic Diseases the following institutions will take part in the program: Columbia University, Massachusetts General Hospital, University of Miami (Fla.), University of Pennsylvania, University of Colorado, University of California (Los Angeles and San Francisco), University of Illinois, and University of Michigan.

SENATE SESSIONS SLATED ON AGING PROBLEMS

A special Senate Subcommittee, set up to investigate the problems of the elderly, charted panel discussions starting June 16 as the groundwork for later hearings across the nation.

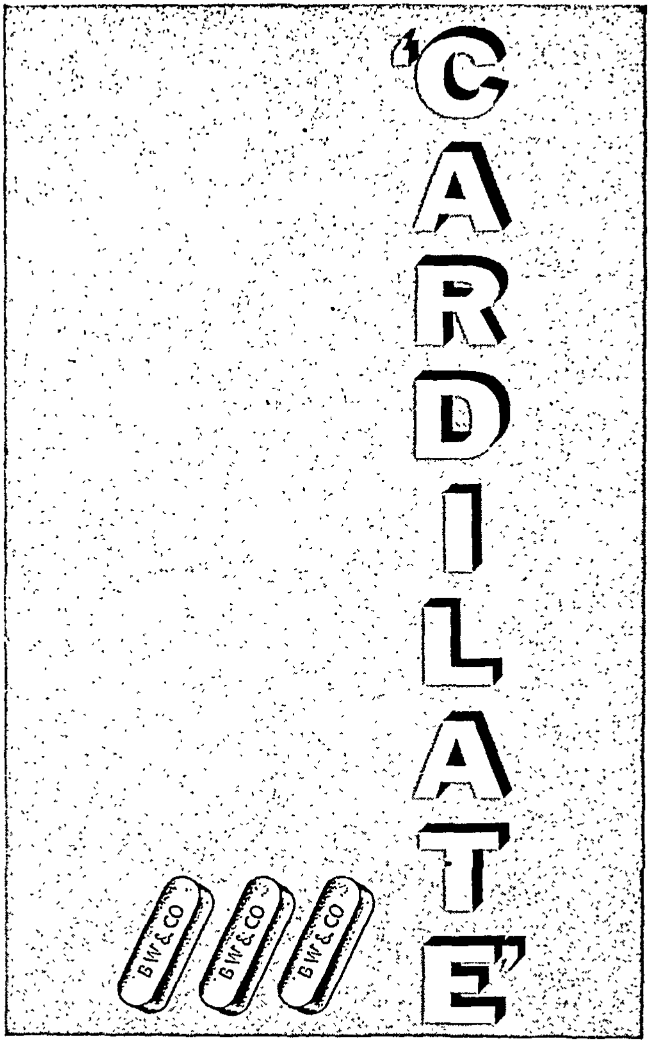
Experts on various phases of the problem of aging were summoned to public panel discussions for three days. Sidney Spector, staff chief of the Labor and Public Welfare Subcommittee that is headed by Sen. Pat McNamara (D., Mich.), said the sessions are designed to acquaint members of the subcommittee with the broad scope of the problems involved. The discussions will center on income maintenance, financing medical and hospital care, employment, and housing.

Among other panelists scheduled to participate are Dr. Howard A. Rusk of New York University College of Medicine and Bellevue Medical Center; Dr. Frederick Swartz, chairman of the American Medical Association Committee on Aging, and Nelson Cruikshank, director of the AFL-CIO Department of Social Security.

MISCELLANY

HEW Secretary Arthur S. Flemming formally sent to Congress a proposed bill to insure safe use of color additives in foods, drugs, and cosmetics. The measure would authorize tolerances, limitations, and other conditions of use, and provide for official testing and certification. At present, the government must ban any coal-tar dyes if their use in large quantities is harmful, even though small quantities would be safe.

The Atomic Energy Commission cut the price of carbon-14, a reactor-produced radioisotope widely used in biological and medical research, from between $22 and $28 a millicurie to $13 a millicurie. Price reductions were also made for the less widely-used radioisotopes chlorine-36, gold-198, and iron-59.



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MEETINGS

AMERICAN MEDICAL ASSOCIATION: Dr. F. J. L. Blasingame, 535 North Dearborn St., Chicago 10, Executive Vice-President.

1959 Clinical Meeting, Dallas, Texas, Dec. 1-4.

1960 Annual Meeting, Miami Beach, Fla., June 13-17.

1960 Clinical Meeting, Washington, D. C., Nov. 29-Dec. 2.

1961 Annual Meeting, New York City, June 26-30.

1961 Clinical Meeting, Denver, Nov. 28-Dec. 1.

AMERICAN

1959

June

Air Pollution Control Association, Hotel Statler, Los Angeles, June 22-26. Mr. Harry M. Pier, 4400 Fifth Ave., Pittsburgh 13, Executive Secretary.

American Electroencephalographic Society, Claridge Hotel, Atlantic City, N. J., June 11-14. Dr. Jerome K. Merlis, University Hospital, Baltimore 1, Secretary.

American Neurological Association, Claridge Hotel, Atlantic City, N. J., June 15-17. Dr. Charles Rupp, 133 S. 36th St., Philadelphia 4, Secretary.

American Orthopedic Association, Lake Placid Club, Lake Placid, N. Y., June 16-18. Dr. Lee Ramsey Straub, 535 E. 70th St., New York 21, Secretary.

American Physical Therapy Association, Hotel Leamington, Minneapolis, June 21-26. Miss Annetta Cornell Wood, 1790 Broadway, New York 19, Executive Director.

American Proctologic Society, Shelburne Hotel, Atlantic City, N. J., June 15-18. Dr. Norman D. Nigro, 10 Peterboro St., Detroit 1, Secretary.

Idaho State Medical Association, Sun Valley, June 14-17. Mr. Armand L. Bird, 364 Sonna Bldg., Boise, Executive Secretary.

Intermountain Pediatric Society, Sun Valley, Idaho, June 26-28. Dr. J. R. Newton, Memorial Medical Center, 2000 S. 9th E., Salt Lake City, Utah, Publicity Chairman.

Maine Medical Association, The Samoset, Rockland, June 21-23. Dr. Daniel F. Hanley, P. O. Box 240, Brunswick, Executive Director.

Medical Library Association, King Edward-Sheraton Hotel, Toronto, Can., June 15-19. Miss Nettie A. Mehne, The Upjohn Co., Kalamazoo, Mich., Secretary.

Society of Biological Psychiatry, Claridge Hotel, Atlantic City, N. J., June 13-14. Dr. George N. Thompson, 2010 Wilshire Blvd., Los Angeles 57, Secretary.

Society of Nuclear Medicine, Palmer House, Chicago, June 18-20. Dr. Morris T. Friedell, 104 S. Michigan Ave., Chicago 3, Chairman, Press & Public Relations Committee.

South Dakota State Medical Association, Sheraton Johnson Hotel, Rapid City, June 20-23. Mr. John C. Foster, 300, 1st National Bank Bldg., Sioux Falls, Executive Secretary.

Upper Peninsula Michigan Medical Society, Gateway, Land of Lakes, Wis., June 19-20. Dr. Richard D. Cecconi, Iron Mountain, Mich., Secretary.

Wyoming State Medical Association, Jackson Lake Lodge, Moran, June 11-14. Mr. Arthur R. Abbey, Box 2036, Cheyenne, Executive Secretary.

July

American Society of Facial Plastic Surgery, New York City, July 17. Dr. Samuel M. Bloom, 123 E. 83rd St., New York 28, Secretary.

American Society of X-ray Technicians, Shirley Savoy Hotel, Denver, July 4-9. Miss Genevieve J. Eilert, 16 14th St., Fond du Lac, Wis., Executive Secretary.

Oregon Cancer Conference, University of Oregon Medical School, Portland, July 16-17. Dr. Martin A. Howard, 1115 S. W. Taylor St., Portland 5, Ore., Chairman.

Rocky Mountain Cancer Conference, Brown Palace Hotel, Denver, July 22-23. Dr. N. Paul Isbell, 835 Republic Bldg., Denver 2, Chairman.

August

American Congress of Physical Medicine and Rehabilitation, Hotel Leamington, Minneapolis, Aug. 30-Sept. 4. Miss Dorothea C. Augustin, 30 N. Michigan Ave., Chicago 2, Executive Secretary.

American Dietetic Association, Statler Hilton, Los Angeles, Aug. 25-28. Miss Ruth M. Yakel, 620 N. Michigan Ave., Chicago 11, Executive Secretary.

American Hospital Association, Statler Hotel, New York City, Aug. 24-27. Dr. Edwin L. Crosby, 18 E. Division St., Chicago, Director and Secretary.

American Veterinary Medical Association, Hotel Muehlebach, Kansas City, Mo., Aug. 24-28. H. E. Kingman Jr., D.V.M., 600 S. Michigan Ave., Chicago 5, Executive Secretary.

Biological Photographic Association, Inc., Sheraton-Mount Royal Hotel, Montreal, Canada, Aug. 31-Sept. 3. Miss Jane H. Waters, Box 1668, Grand Central P. O., New York 17, Executive Secretary.

National Medical Association, Detroit, Aug. 10-13. Dr. John T. Givens, 1108 Church St., Norfolk, Va., Secretary.

Nevada State Medical Association, Reno, Aug. 19-22. Dr. Gilbert G. Lenz, 505 S. Arlington Ave., Reno, Nev., Chairman.

Rocky Mountain Radiological Society, Shirley-Savoy Hotel, Denver, Aug. 20-22. Dr. John H. Freed, 4200 E. Ninth Ave., Denver 20, Secretary-Treasurer.

West Virginia State Medical Association, The Greenbrier, White Sulphur Springs, Aug. 20-22. Mr. Charles Lively, P. O. Box 1031, Charleston 24, Executive Secretary.

September

American Association of Medical Clinics, Sheraton-Blackstone Hotel, Chicago, Sept. 24-26. Dr. Edwin P. Jordan, Box 58, Charlottesville, Va., Executive Secretary.

American Association of Obstetricians and Gynecologists, The Homestead, Hot Springs, Va., Sept. 10-12. Dr. E. Stewart Taylor, 4200 E. Ninth Ave., Denver 20, Secretary.

American Association for the Surgery of Trauma, Mount Washington Hotel, Bretton Woods, N. H., Sept. 24-26. Dr. William T. Fitts, Jr., 3400 Spruce St., Philadelphia 4, Secretary.

American College of Gastroenterology, Biltmore Hotel, Los Angeles, Sept. 19-26. Mr. Daniel Weiss, 33 W. 60th St., New York 23, N. Y., Executive Director.

American College of Surgeons, The Traymore Hotel, Atlantic City, N. J., Sept. 28-Oct. 2. Dr. Paul R. Hawley, 40 E. Erie St., Chicago 11, Director.

American College of Surgeons, Ohio Chapter, Statler Hotel, Cleveland, Sept. 11-12. Dr. Berton M. Bogle, 311 S. Market, Troy, Ohio, Secretary-Treasurer.

American Roentgen Ray Society, The Netherland Hilton Hotel, Cincinnati, Sept. 22-25. Dr. C. Allen Good, Mayo Clinic, Rochester, Minn., Secretary.

American Society of Clinical Pathologists, The Palmer House, Chicago, Sept. 7-11. Mr. Claude E. Wells, 2052 N. Orleans, Chicago 14, Executive Secretary.

Central Association of Obstetricians and Gynecologists, Drake Hotel, Chicago, Sept. 24-26. Dr. Edwin J. DeCosta, 104 S. Michigan Ave., Chicago 3, Secretary.

College of American Pathologists, The Palmer House, Chicago, Sept. 6. Dr. Arthur H. Dearing, Suite 2115, Prudential Plaza, Chicago 1, Executive Director.

Colorado State Medical Society, Brown Palace and Shirley Savoy Hotels, Denver, Sept. 8-11. Mr. Harvey T. Sethman, 835 Republic Bldg., Denver 2, Executive Secretary.

International College of Surgeons, Tennessee Section, Chattanooga, Sept. 28-29. Dr. William G. Stephenson, Medical Arts Bldg., Chattanooga, Tenn., Regent.

Kentucky State Medical Association, Columbia Auditorium, Louisville, Sept. 22-24. Mr. Joseph P. Sanford, 1169 Eastern Pkwy., Louisville 17, Ky., Executive Secretary.

Maryland, Medical and Chirurgical Faculty of the State of, Semiannual Meeting. Ocean City, Sept. 18. Mr. John Sargeant, 1211 Cathedral St., Baltimore 1, Executive Secretary.

Medical Progress Assembly, Tutwiler Hotel, Birmingham, Ala., Sept. 13-15. Dr. Herbert H. Thomas, 920 S. 19th St., Birmingham, Ala., Chairman, Publicity Committee.

Michigan State Medical Society, Pantlind Hotel, Grand Rapids, Sept. 28-29, Oct. 1-3. Mr. William J. Burns, 606 Townsend St., Lansing 15, Mich., Executive Secretary.

Mid-Continent Psychiatric Association, Holiday Inn Motor Hotel, St. Louis County, Mo., Sept. 18-20. Dr. W. Payton Kolb, Baptist Medical Arts Bldg., Little Rock, Ark., Secretary.

Montana Medical Association, Finlen Hotel, Butte, Sept. 17-19. Mr. L. Russell Hegland, 1236 N. 28th St., Billings, Mont., Executive Secretary.

National Recreation Congress, Morrison Hotel, Chicago, Sept. 28-Oct. 2. Mr. Jesse Reynolds, Department of Recreation and Parks, The Mosque, Laurel and Main Streets, Richmond 20, Va., Chairman.

North American Federation, International College of Surgeons, Chicago, Sept. 13-17. For information write the Secretariat, 1516 Lake Shore Dr., Chicago 10.

Oregon State Medical Society, Medford Hotel, Medford, Sept. 23-25. Mr. Roscoe K. Miller, 1115 S. W. Taylor St., Portland 5, Ore., Executive Secretary.

Tennessee Valley Medical Assembly, Chattanooga, Tenn., Sept. 28-29. Dr. Guy M. Francis, 109 Medical Arts Bldg., Chattanooga 2, Tenn., Chairman.

(Continued on page 32)

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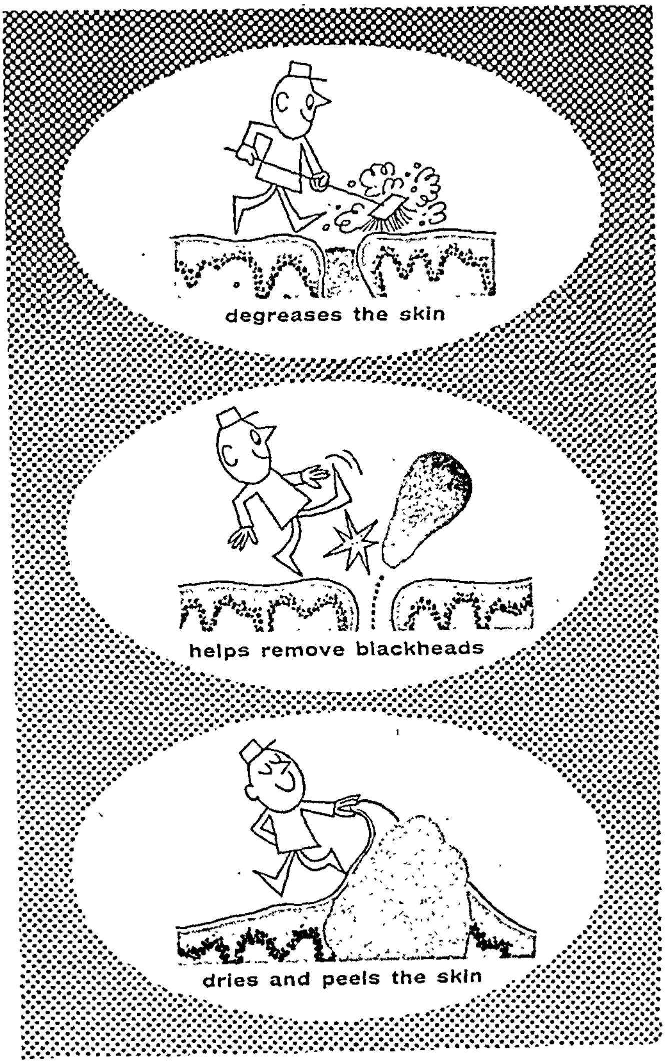

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United States Section, International College of Surgeons, Palmer House, Chicago, Sept. 13-17. Dr. Ross T. McIntyre, 1516 Lake Shore Dr., Chicago 10, Executive Secretary.

Utah State Medical Association, Hotel Utah Motor Lodge, Salt Lake City, Sept. 16-18. Mr. Harold Bowman, 42 S. 5th East, Salt Lake City 2, Executive Secretary.

Washington State Medical Association, Olympic Hotel, Seattle, Sept. 13-16. Mr. Ralph W. Neill, 1309 Seventh Ave., Seattle 1, Executive Secretary.

World Medical Association, Montreal, Canada, Sept. 7-12. Dr. Louis H. Bauer, 10 Columbus Circle, New York 19, Secretary-General.

October

Academy of Psychosomatic Medicine, Sheraton-Cleveland Hotel, Cleveland, Oct. 15-17. For information write: Dr. Bertram B. Moss, Suite 1035, 55 E. Washington St., Chicago 2, Secretary.

American Academy of Ophthalmology and Otolaryngology, The Palmer House, Chicago, Oct. 11-16. Dr. William L. Benedict, 15 Second St., S. W., Rochester, Minn., Executive Secretary.

American Academy of Pediatrics, The Palmer House, Chicago, Oct. 5-8. Dr. E. H. Christopherson, 1801 Hinman Ave., Evanston, Ill., Executive Secretary.

American Association of Medical Assistants, Benjamin Franklin Hotel, Philadelphia, Oct. 16-18. Mrs. Stella Thurnau, 510 N. Dearborn, Room 924, Chicago 10, Executive Secretary.

American Association of Medical Record Librarians, Radisson Hotel, Minneapolis, Oct. 12-15. Miss Margaret G. Scully, 510 N. Dearborn St., Chicago 10, Director.

American College of Chest Physicians, 25th Anniversary Homecoming Meeting, Albuquerque, N. M., Oct. 14-17. Mr. Murray Kornfeld, 112 E. Chestnut St., Chicago 11, Executive Director.

American College of Preventive Medicine, Hotel Ambassador, Atlantic City, N. J., Oct. 21-22. Dr. John J. Wright, P. O. Box 1267, Chapel Hill, N. C., Secretary-Treasurer.

American Heart Association, Trade and Convention Center, Philadelphia, Oct. 23-27. Mr. William F. McGlone, 44 E. 23rd St., New York 10, Secretary.

American Medical Writers' Association, Chase Hotel, St. Louis, Oct. 2-3. Dr. Harold Swanberg, 510 Maine St., Quincy, Ill., Secretary.

American Otorhinologic Society for Plastic Surgery, Inc., Conrad Hilton Hotel, Chicago, Oct. 11. Dr. Joseph G. Gilbert, 75 Barberry Lane, Roslyn Heights, N. Y., Secretary.

American Psychiatric Association, Detroit Divisional Meeting, Hotel Statler, Detroit, Oct. 29-31. Dr. Benjamin Jeffries, 16321 Mack Ave., Detroit 24, Co-Chairman, Planning Committee.

American Public Health Association, Convention Hall, Atlantic City, N. J., Oct. 19-23. Dr. Berwyn F. Mattison, 1790 Broadway, New York 19, N. Y., Executive Director.

American School Health Association, Claridge Hotel, Atlantic City, N. J., Oct. 18-23. Dr. A. O. DeWeese, 515 E. Main St., Kent, Ohio, Executive Secretary.

American Society of Anesthesiologists, Inc., Americana Hotel, Bal Harbor, Fla., Oct. 5-9. Mr. John W. Andes, 188 W. Randolph St., Room 1101, Chicago 1, Executive Secretary.

American Society of Facial Plastic Surgery, Chicago, Oct. 15-17. Dr. Samuel M. Bloom, 123 E. 83rd St., New York 28, Secretary.

American Society of Plastic and Reconstructive Surgery, Hotel Fountainebleau, Miami Beach, Fla., Oct. 18-23. Dr. Thomas Ray Broadbent, 508 E. South Temple, Salt Lake City, General Secretary.

American Society of Tropical Medicine and Hygiene, Claypool Hotel, Indianapolis, Oct. 28-31. Dr. Rolla B. Hill, 3575 St. Gaudens Road, Miami 33, Fla., Executive Secretary.

Association of Clinical Scientists, Sheraton-Park Hotel, Washington, D. C., Oct. 10. Dr. Robert P. MacFate, 323 Northwood Rd., Riverside, Ill., Secretary-Treasurer.

Association of Life Insurance Medical Directors of America, Hotel Statler Hilton, New York City, Oct. 21-23. Dr. Royal S. Schaaf, Prudential Insurance Co., P. O. Box 594, Newark 1, N. J., Secretary.

Association of Medical Illustrators, Seattle, Oct. 5-7. Miss Rose M. Reynolds, University of Nebraska College of Medicine, 42nd Dewey Ave., Omaha 5, Corresponding Secretary.

Central Neuropsychiatric Association, Hotel Roosevelt, New Orleans, Oct. 16-17. Dr. Ralph M. Patterson, Columbus Psychiatric Institute, 473 W. 12th Ave., Columbus 10, Ohio.

Congress of Neurological Surgeons, Americana Hotel, Miami, Fla., Oct. 28-31. Dr. Richard L. DeSaussure, Suite 101 B, 20 S. Dudley St., Memphis, Tenn., Secretary-Treasurer.

Delaware, Medical Society of, Oct. 14-15. Mr. Lawrence J. Morris Jr., 621 Delaware Ave., Wilmington 1, Del.

Indiana State Medical Association, Murat Temple, Indianapolis, Oct. 6-9. Mr. James A. Waggener, 1021 Hume Mansur Bldg., Indianapolis 4, Executive Secretary.

National Rehabilitation Association, Statler-Hilton Hotel, Boston, Oct. 26-28. Mr. Edward D. Callahan, 14 Court Square, Boston 8, Conference Chairman.

New Hampshire Medical Society, Equinox House, Manchester, Vt., Oct. 1-4. Mr. Hamilton S. Putnam, 18 School St., Concord, N. H., Executive Secretary.

[illegible] Medical Society of the State of, Penn-Sheraton Hotel, Pittsburgh, Oct. 18-23. Mr. Lester H. Perry, 230 State St., Harrisburg, P[illegible]ive Director.

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